Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Intake Camshaft Actuator Solenoid Circuit – Bank 1	P0010	Detects a VVT system error by monitoring the circuit for electrical integrity	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		System supply voltage is within limits Output driver is commanded on, Ignition switch is in crank or run position	> 11 Volts, and < 32 Volts	20 failures out of 25 samples 250 ms /sample, continuous	Trips 2 B Type
Intake Camshaft System Performance – Bank 1	P0011	Detects a VVT system error by comparing the desired and actual cam positions when VVT is activated	Camshaft position error [absolute value of (desired position - actual position)] is compared to thresholds to determine if excessive	(Intake cam Bank 1)Cam Position Error > KtPHSD_phi_CamPosErrorLimIc1 Deg (see Supporting Table)	DTC's are NOT active: P0010 IntkCMP B1 Circuit IntakeCamSensorTFTKO CrankSensorTFTKO CrankIntakeCamCorrelationFA Engine is running VVT is enabled Desired camshaft position > 0 Power Take Off (PTO) not active	System Voltage > 11 Volts, and System Voltage < 32 Volts Both Desired & Measured cam positions cannot be < KtPHSD_phi_CamPosErrorLimIc1 or > than (25.0 - KtPHSD_phi_CamPosErrorLimIc1). Desired cam position cannot vary more than 3.0 Cam Deg for at least KtPHSD_t_StablePositionTimeIc1 seconds (see Supporting Tables) 100 ms /sample	135 failures out of 150 samples	Trips 2 B Type
Exhaust Camshaft Actuator Solenoid Circuit – Bank 1	P0013	Detects a VVT system error by monitoring the circuit for electrical integrity	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		System supply voltage is within limits Output driver is commanded on, Ignition switch is in crank or run position	> 11 Volts, and < 32 Volts	20 failures out of 25 samples 250 ms /sample, continuous	Trips 2 B Type

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Exhaust Camshaft System Performance – Bank 1	P0014	Detects a VVT system error by comparing the desired and actual cam positions when VVT is activated	Camshaft position error [absolute value of (desired position - actual position)] is compared to thresholds to determine if excessive	(Exhaust cam Bank 1)Cam Position Error > KtPHSD_phi_CamPosErrorLimEc1 Deg (see Supporting Table)	DTC's are NOT active: P0013 IntkCMP B1 Circuit ExhaustCamSensorTFTKO CrankSensorTFTKO CrankExhaustCamCorrelationFA Engine is running VVT is enabled Desired camshaft position > 0 Power Take Off (PTO) not active	System Voltage > 11 Volts, and System Voltage < 32 Volts Both Desired & Measured cam positions cannot be < KtPHSD_phi_CamPosErrorLimEc1 or > than (Exh25.0 - KtPHSD_phi_CamPosErrorLimEc1) . Desired cam position cannot vary more than 3.0 Cam Deg for at least KtPHSD_t_StablePositionTimeEc1 seconds (see Supporting Tables)	135 failures out of 150 samples 100 ms /sample	Trips 2 B Type
Crankshaft Position (CKP)-Camshaft Position (CMP) Correlation Bank 1 Sensor A	P0016	Detects cam to crank misalignment by monitoring if cam sensor pulse for bank 1 sensor A occurs during the incorrect crank position	4 cam sensor pulses more than -9 crank degrees before or 12 crank degrees after nominal position in one cam revolution.		Crankshaft and camshaft position signals are synchronized Engine is Spinning Cam phaser is in "parked" position No Active DTCs: Time since last execution of diagnostic	 P0335, P0336 P0340, P0341 5VoltReferenceA_FA 5VoltReferenceB_FA < 1.0 seconds	2 failures out of 3 tests. A failed test is 4 failures out of 5 samples. There is a delay after the first failed test to allow the camshaft position to return to the park position. This time is defined by the table "Cam Correlation Oil Temperature Threshold".	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
							One sample per cam rotation	
Crankshaft Position (CKP)-Camshaft Position (CMP) Correlation Bank 1 Sensor B	P0017	Detects cam to crank misalignment by monitoring if cam sensor pulse for bank 1 sensor B occurs during the incorrect crank position	4 cam sensor pulses more than -9 crank degrees before or 12 crank degrees after nominal position in one cam revolution.		Crankshaft and camshaft position signals are synchronized Engine is Spinning Cam phaser is in "parked" position No Active DTCs: Time since last execution of diagnostic	 P0335, P0336 P0365, P0366 5VoltReferenceA_FA 5VoltReferenceB_FA < 1.0 seconds	2 failures out of 3 tests. A failed test is 4 failures out of 5 samples. There is a delay after the first failed test to allow the camshaft position to return to the park position. This time is defined by the table "Cam Correlation Oil Temperature Threshold". One sample per cam rotation	Type B 2 trips
O2S Heater Control Circuit Bank 1 Sensor 1	P0030	This DTC checks the Heater Output Driver circuit for electrical integrity.	Voltage low during driver open state (indicates short-to-ground or open circuit) or voltage high during driver closed state (indicates short to voltage).		Ignition Ignition Voltage Engine Speed	= Crank or Run 11.0 < Volts < 32.0 > 400 RPM	20 failures out of 25 samples 250 ms / sample Continuous	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Turbo/Super Charger Bypass Valve Control Circuit	P0033	Detect Turbochharger Bypass Valve - Open Circuit	ECM detects that commanded and actual states of output driver do not match because the output is open circuit		Diagnosis Enabled Powertrain relay Voltage Powertrain relay Voltage Ignition run crank voltage Ignition run crank voltage Engine is not cranking	Enabled >= 11.00 Volts <= 32.00 Volts >= 2.00 Volts <= 6.00 Volts	20 failures out of 100 samples 1 sample every 100ms	Type B 2 trips
Turbo/Super Charger Bypass Valve Control Circuit Low	P0034	Detect Turbochharger Bypass Valve - Shorted to Ground	ECM detects that commanded and actual states of output driver do not match because the output is shorted to ground		Diagnosis Enabled Powertrain relay Voltage Powertrain relay Voltage Ignition run crank voltage Ignition run crank voltage Engine is not cranking	Enabled >= 11.00 Volts <= 32.00 Volts >= 2.00 Volts <= 6.00 Volts	20 failures out of 100 samples 1 sample every 100ms	Type B 2 trips
Turbo/Super Charger Bypass Valve Control Circuit High	P0035	Detect Turbochharger Bypass Valve - Shorted to Power	ECM detects that commanded and actual states of output driver do not match because the output is shorted to power		Diagnosis Enabled Powertrain relay Voltage Powertrain relay Voltage Ignition run crank voltage Ignition run crank voltage Engine is not cranking	Enabled >= 11.00 Volts <= 32.00 Volts >= 2.00 Volts <= 6.00 Volts	20 failures out of 100 samples 1 sample every 100ms	Type B 2 trips
O2S Heater Control Circuit Bank 1 Sensor 2	P0036	This DTC checks the Heater Output Driver circuit for electrical integrity.	Voltage low during driver open state (indicates short-to-ground or open circuit) or voltage high during driver closed state (indicates short to voltage).		Ignition Ignition Voltage Engine Speed	= Crank or Run 11.0 < Volts < 32.0 > 400 RPM	20 failures out of 25 samples 250 ms / sample Continuous	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
HO2S Heater Resistance Bank 1 Sensor 1	P0053	Detects an oxygen sensor heater having an incorrect or out of range resistance value.	Heater Resistance	3.7 < Ω < 8.7	No Active DTC's Coolant – IAT Engine Soak Time Coolant Temp Ignition Voltage Engine Run time	ECT_Sensor_FA P2610 IAT_SensorFA < 8.0 ºC > 28800 seconds -30.0 < ºC < 45.0 < 32.0 volts < 0.00 seconds	Once per valid cold start	2 trips Type B
HO2S Heater Resistance Bank 1 Sensor 2	P0054	Detects an oxygen sensor heater having an incorrect or out of range resistance value.	Heater Resistance	3.6 < Ω < 10.3	No Active DTC's Coolant – IAT Engine Soak Time Coolant Temp Ignition Voltage Engine Run time	ECT_Sensor_FA P2610 IAT_SensorFA < 8.0 ºC > 28800 seconds -30.0 < ºC < 45.0 < 32.0 volts < 0.10 seconds	Once per valid cold start	2 trips Type B
MAP / MAF / Throttle Position Correlation	P0068	Detect when MAP and MAF do not match estimated engine airflow as established by the TPS	Difference between MAP and estimated MAP exceeds threshold (kPa), or P0651 (5 Volt Ref), or P0107 (MAP circuit low), or P0108 (MAP circuit high) have failed this key cycle, then MAP portion of diagnostic fails	Table, f(TPS). See supporting tables	Engine Speed	> 800 RPM Run/Crank voltage or Powertrain relay voltage > 6.41 and reduced power is false, else the failure will be reported for all conditions	Continuously fail MAP and MAF portions of diagnostic for 0.1875 s Continuous in MAIN processor	Trips: 1 Type: A MIL: YES
			Absolute difference between MAF and estimated MAF exceed threshold (grams/sec), or P0102 (MAF circuit low), or P0103 (MAF circuit hi) have failed this key cycle, or maximum MAF versus RPM (Table) is greater than or equal to maximum MAF versus battery voltage, then MAF portion of diagnostic fails	Table, f(TPS). See supporting tables Table, f(RPM). See supporting tables Table, f(Volts). See supporting tables				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Internal Control Module SIDI High Pressure Pump min/max authority	P0089	This DTC Detects pump control windup to its max or min authority	High Pressure Fuel Pump Delivery Angle	>= 132 °	Battery Voltage	11 <= Volts <= 32	Windup High - 750 failures out of 938 samples	2 trips Type B
				Or	Low Side Fuel Pressure	> 0.250 MPa		
			High Pressure Fuel Pump Delivery Angle	<= 0 °	Engine Run Time	>= KtFHPD_t_PumpCntrlEngRunThrsh (see supporting tables) Enabled when a code clear is not active or not exiting device control Engine is not cranking	Windup Low - 750 failures out of 938 Samples	
						>= 70.0		
					Barometric Pressure	>= -10.0		
					Inlet Air Temp	-10 ≤ Temp degC ≤ 100		
					Fuel Temp			
					Additional Enable Conditions:			
						High Pressure Pump is enabled		
						Estimate fuel rail pressure is valid		
						Green Engine (In assembly plant) is not enabled		
						Not LowFuelConditionDiagnostic		
						Low side Fuel Pump is on		
						Injector Flow Test is not active		
						Device control commanded pressure is false		
						Device control pump ckt enabled on is false		
						Engine movement detected is true (Function of crankshaft and camshaft position)		
						Manufacturers enable counter is 0		
					DTC's not active:	FHPR_b_FRP_SnsrCkt_FA FHPR_b_FRP_SnsrCkt_TFTKO FHPR_b_PumpCkt_FA FHPR_b_PumpCkt_TFTKO		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						CrankSensorFA CamSensorFA IAT_SensorFA IAT2_SensorFA ECT_Sensor_FA Ethanol Composition Sensor FA PowertrainRelayFault FHPR_b_PumpCkt_FA		
High Pressure Pump Cntrl Solenoid Enable Low Side Open Circuit	P0090	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the high pressure fuel pump solenoid low side is open circuit		Engine Speed Battery Voltage	>= 50 RPM 11 <= volts <= 32 Not in pump device control Enabled when a code clear is not active or not exiting device control	20 failures out of 40 samples 100 ms /sample Continuous	1 trips Type A
High Pressure Pump Cntrl Solenoid Enable Low Side Short to Ground	P0091	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the high pressure fuel pump solenoid low side is short to ground		Engine Speed Battery Voltage	>= 50 RPM 11 <= volts <= 32 Not in pump device control Enabled when a code clear is not active or not exiting device control	20 failures out of 40 samples 100 ms /sample Continuous	1 trips Type A
High Pressure Pump Cntrl Solenoid Enable Low Side Short to Power P0092	P0092	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the high pressure fuel pump solenoid low side is short to power		Engine Speed Battery Voltage	>= 50 RPM 11 <= volts <= 32 Not in pump device control Enabled when a code clear is not active or not exiting device control	20 failures out of 40 samples 100 ms /sample Continuous	1 trips Type A
Intake Air Temperature Sensor 2 Circuit Performance	P0096	Detects an IAT2 sensor that has stuck in range by comparing to IAT and engine coolant temperature at startup	ABS(Power Up IAT - Power Up IAT2) AND ABS(Power Up ECT – Power Up IAT2) >= ABS(Power Up ECT – Power Up IAT)	> 20 deg C	Time between current ignition cycle and the last time the engine was running No Active DTCs:	> 28800 seconds ECT_Sensor_Ckt_FA IAT_SensorCircuitFA IAT2_SensorCircuitFA	Executes once at the beginning of each ignition cycle if enable conditions are met	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Intake Air Temperature Sensor Circuit 2 Low (High Temperature)	P0097	Detects a continuous short to ground in the IAT 2 signal circuit or the IAT 2 sensor	Raw IAT 2 Input	< 57 Ohms (~150 deg C)	Engine Run Time	> 0.0 seconds	40 failures out of 50 samples 1 sample every 100 msec	Type B 2 trips
Intake Air Temperature Sensor Circuit 2 High (Low Temperature)	P0098	Detects a continuous open circuit in the IAT 2 signal circuit or the IAT 2 sensor	Raw IAT 2 Input	> 162529 Ohms (~-60 deg C)	Engine Run Time	> 0.0 seconds	40 failures out of 50 samples 1 sample every 100 msec	Type B 2 trips
High Pressure Start Diagnostic	P00C6	This DTC checks the high side fuel pressure during engine cranking	The ECM detects that the fuel pressure is not rising or has fallen beyond acceptable limits during engine cranking	Pressure Fall Test: High Side Fuel Rail Pressure <= Supporting Table KtFHPD_p_HPS_PressFallLoThrsh Pressure Rise Test: High Side Fuel Pressure < Supporting Table KtFHPC_p_HighPressStart	Low side feed fuel pressure Engine Run Time Run/Crank Voltage Engine Coolant Barometric Pressure Inlet Air Temp For each engine start, only 1 diagnostic is performed. The pressure rise test will run if HIgh side fuel pressure is less than KtFHPC_p_HighPressStart, otherwise, the pressure fall diagnostic will run The pressure fall runs when the engine is cranking	>= 0 < = 0 > 8 Volts -100 <= °C <= 80 >= 70.0 >= -10.0	Pressure Fall Test: Injected cylinder events >= Supporting Table KtFHPD_Cnt_HPS_PressFallLoThrsh Pressure Rise Test: Time >= Supporting Table KtFHPC_t_HighPressStartTmout	2 trips Type B
					Additional Enable Conditions:			
						High Pressure Pump is enabled		
						Estimate fuel rail pressure is valid		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						Green Engine (In assembly plant) is not enabled		
						Not LowFuelConditionDiagnostic		
						Low side Fuel Pump is on		
						Injector Flow Test is not active		
						Device control commanded pressure is false		
						Device control pump ckt enabled on is false		
						Engine movement detected is true (Function of crankshaft and camshaft position)		
						Manufacturers enable counter is 0		
					DTC's not active:	FHPR_b_FRP_SnsrCkt_FA		
						FHPR_b_FRP_SnsrCkt_TFTKO		
						FHPR_b_PumpCkt_FA		
						FHPR_b_PumpCkt_TFTKO		
						CrankSensorFA		
						CamSensorFA		
						IAT_SensorFA		
						IAT2_SensorFA		
						ECT_Sensor_FA		
						Ethanol Composition Sensor FA		
						PowertrainRelayFault		
						FHPR_b_PumpCkt_FA		
Intake Air Pressure Measurement System - Multiple Sensor Correlation	P00C7	Detects an inconsistency between pressure sensors in the induction system in which a particular sensor cannot be identified as the failed sensor	ABS(Manifold Pressure - Baro Pressure) AND ABS(Turbocharger Boost Pressure - Manifold Pressure) AND ABS(Turbocharger Boost Pressure - Baro Pressure) OR ABS(Manifold Pressure -	> 10.0 kPa <= 10.0 kPa <= 10.0 kPa	Time between current ignition cycle and the last time the engine was running Engine is not rotating Manifold Pressure Manifold Pressure Baro Pressure	> 10.0 seconds >= 50.0 kPa <= 115.0 kPa >= 50.0 kPa	4 failures out of 5 samples 1 sample every 12.5 msec	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Baro Pressure)		Baro Pressure	<= 115.0 kPa		
				<= 10.0 kPa	Turbocharger Boost Pressure	>= 50.0 kPa		
			AND ABS(Turbocharger Boost Pressure - Manifold Pressure)	> 10.0 kPa	Turbocharger Boost Pressure	<= 115.0 kPa		
			AND ABS(Turbocharger Boost Pressure - Baro Pressure)		No Active DTCs:	EngModeNotRunTmErr MAP_SensorFA AAP_SnsrFA AAP2_SnsrFA		
				<= 10.0 kPa				
			OR		No Pending DTCs:	MAP_SensorCircuitFP AAP_SnsrCktFP AAP2_SnsrCktFP		
			ABS(Manifold Pressure - Baro Pressure)					
				<= 10.0 kPa				
			AND ABS(Turbocharger Boost Pressure - Manifold Pressure)	<= 10.0 kPa				
			AND ABS(Turbocharger Boost Pressure - Baro Pressure)					
				> 10.0 kPa				
			OR					
			ABS(Manifold Pressure - Baro Pressure)					
				> 10.0 kPa				
			AND ABS(Turbocharger Boost Pressure - Manifold Pressure)	> 10.0 kPa				
			AND ABS(Turbocharger Boost Pressure - Baro Pressure)					
				> 10.0 kPa				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Fuel Press Regulator Solenoid Supply Voltage Control Circuit/Open	P00C8	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the Fuel Press Regulator Solenoid Supply Voltage Control Circuit/Open		Engine Speed Battery Voltage	>= 50 RPM 11 <= Volts <= 32 Not in pump device control Enabled when a code clear is not active or not exiting device control	20 failures out of 40 samples 100 ms /sample Continuous	1 trips Type A
Fuel Press Regulator Solenoid Supply Voltage Control Circuit Low	P00C9	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the Fuel Press Regulator Solenoid Supply Voltage Control short to ground		Engine Speed Battery Voltage	>= 50 RPM 11 <= Volts <= 32 Not in pump device control Enabled when a code clear is not active or not exiting device control	20 failures out of 40 samples 100 ms /sample Continuous	1 trips Type A
Fuel Press Regulator Solenoid Supply Voltage Control Circuit High	P00CA	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the Fuel Press Regulator Solenoid Supply Voltage Control short to power		Engine Speed Battery Voltage	>= 50 RPM 11 <= Volts <= 32 Not in pump device control Enabled when a code clear is not active or not exiting device control	20 failures out of 40 samples 100 ms /sample Continuous	1 trips Type A
Mass Air Flow System Performance	P0101	Determines if the MAF sensor is stuck within the normal operating range	See table "Turbocharger Intake Flow Rationality Diagnostic Failure Matrix" for combinations of model failures that can set this DTC. MAF model fails when ABS(Measured Flow – Modeled Air Flow) Filtered MAP1 model fails when ABS(Measured MAP – MAP Model 1) Filtered MAP2 model fails when	 > 20 grams/sec > 24.0 kPa	Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together)	>= 400 RPM <= 6000 RPM > -7 Deg C < 125 Deg C > -20 Deg C < 125 Deg C >= 0.00 Modeled Air Flow Error multiplied by MAF Residual Weight Factor based on RPM and MAF Residual Weight Factor Based on MAF Est MAP Model 1 Error multiplied by MAP1 Residual Weight Factor based on RPM	Continuous Calculation are performed every 12.5 msec	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			ABS(Measured MAP – MAP Model 2) Filtered	> 22.0 kPa		MAP Model 2 Error multiplied by MAP2 Residual Weight Factor based on RPM		
			MAP3 model fails when					
			ABS(Measured MAP – MAP Model 3) Filtered	> 22.0 kPa		MAP Model 3 Error multiplied by MAP Residual Weight Factor based on RPM		
			TIAP1 model fails when					
			ABS(Measured TIAP – TIAP Model 1) Filtered	> 24.0 kPa		TIAP Model 1 Error multiplied by TIAP Residual Weight Factor based on RPM		
			TPS model fails when					
			Filtered Throttle Model Error	> 200 kPa*(g/s)		Filtered Throttle Model Error multiplied by TPS Residual Weight Factor based on RPM		
			TIAP Correlation model fails when High Engine Air Flow is TRUE AND Measured TIAP - measured MAP - offset as a function of engine speed See table "TIAP-MAP Correlation Offset" OR Low Engine Air Flow is TRUE AND Measured TIAP - measured Baro - offset as a function of engine speed See table "TIAP-Baro Correlation Offset"	> 24.0 kPa > 24.0 kPa	No Active DTCs:	See table "IFRD Residual Weighting Factors". MAP_SensorCircuitFA EGRValve_FP EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA ECT_Sensor_Ckt_FP IAT_SensorFA IAT_SensorCircuitFP IAT2_SensorFA IAT2_SensorCircuitFP TC_BoostPresSnsrCktFA AmbientAirDefault		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			TIAP Correlation is valid when					
			High Engine Air Flow has been TRUE for a period of time	> 1.0 seconds				
			OR High Engine Air Flow has been TRUE for a period of time	> 1.0 seconds				
			High Engine Air Flow is TRUE when					
			Mass Air Flow	> a threshold in gm/sec as a function of engine speed See table "TIAP-MAP Correlation Min Air Flow"				
			AND Manifold Pressure	> a threshold in kPa as a function of engine speed See table "TIAP-MAP Correlation Min MAP"				
			AND Filtered Mass Air Flow - Mass Air Flow	< 3.0 gm/sec				
			Low Engine Air Flow is TRUE when					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Mass Air Flow AND Manifold Pressure AND Mass Air Flow - Filtered Mass Air Flow	< a threshold in gm/sec as a function of engine speed See table "TIAP-Baro Correlation Max Air Flow" < a threshold in kPa as a function of engine speed See table "TIAP-Baro Correlation Max MAP" < 2.0 gm/sec				
Mass Air Flow Sensor Circuit Low Frequency	P0102	Detects a continuous short to low or a open in either the signal circuit or the MAF sensor	MAF Output	<= 750 Hertz (~ 0.92 gm/sec)	Engine Run Time Engine Speed Ignition Voltage Above criteria present for a period of time	> 1.0 seconds >= 300 RPM >= 11.0 Volts >= 1.0 seconds	200 failures out of 250 samples 1 sample every cylinder firing event	Type B 2 trips
Mass Air Flow Sensor Circuit High Frequency	P0103	Detects a high frequency output from the MAF sensor	MAF Output	>= 13350 Hertz (~ 542 gm/sec)	Engine Run Time Engine Speed Ignition Voltage Above criteria present for a period of time	> 1.0 seconds >= 300 RPM >= 11.0 Volts >= 1.0 seconds	200 failures out of 250 samples 1 sample every cylinder firing event	Type B 2 trips
Manifold Absolute Pressure Sensor Performance	P0106	Determines if the MAP sensor is stuck within the normal operating range	See table "Turbocharger Intake Flow Rationality Diagnostic Failure Matrix" for combinations of model failures that can set this DTC.		Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight	>= 400 RPM <= 6000 RPM > -7 Deg C < 125 Deg C > -20 Deg C < 125 Deg C	Continuous Calculation are performed every 12.5 msec	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					factor (all factors multiplied together)			
			MAF model fails when			>= 0.00		
			ABS(Measured Flow – Modeled Air Flow) Filtered	> 20 grams/sec		Modeled Air Flow Error multiplied by MAF Residual Weight Factor based on RPM and MAF Residual Weight Factor Based on MAF Est		
			MAP1 model fails when					
			ABS(Measured MAP – MAP Model 1) Filtered	> 24.0 kPa		MAP Model 1 Error multiplied by MAP1 Residual Weight Factor based on RPM		
			MAP2 model fails when					
			ABS(Measured MAP – MAP Model 2) Filtered	> 22.0 kPa		MAP Model 2 Error multiplied by MAP2 Residual Weight Factor based on RPM		
			MAP3 model fails when					
			ABS(Measured MAP – MAP Model 3) Filtered	> 22.0 kPa		MAP Model 3 Error multiplied by MAP Residual Weight Factor based on RPM		
			TIAP1 model fails when					
			ABS(Measured TIAP – TIAP Model 1) Filtered	> 24.0 kPa		TIAP Model 1 Error multiplied by TIAP Residual Weight Factor based on RPM		
			TPS model fails when					
			Filtered Throttle Model Error	> 200 kPa*(g/s)		Filtered Throttle Model Error multiplied by TPS Residual Weight Factor based on RPM		
			TIAP Correlation model fails when High Engine Air Flow is TRUE AND			See table "IFRD Residual Weighting Factors".		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Measured TIAP - measured MAP - offset as a function of engine speed See table "TIAP-MAP Correlation Offset" OR Low Engine Air Flow is TRUE AND Measured TIAP - measured Baro - offset as a function of engine speed See table "TIAP-Baro Correlation Offset" TIAP Correlation is valid when High Engine Air Flow has been TRUE for a period of time OR High Engine Air Flow has been TRUE for a period of time High Engine Air Flow is TRUE when Mass Air Flow AND	> 24.0 kPa > 24.0 kPa > 1.0 seconds > 1.0 seconds > a threshold in gm/sec as a function of engine speed See table "TIAP-MAP Correlation Min Air Flow"	No Active DTCs:	MAP_SensorCircuitFA EGRValve_FP EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA ECT_Sensor_Ckt_FP IAT_SensorFA IAT_SensorCircuitFP IAT2_SensorFA IAT2_SensorCircuitFP TC_BoostPresSnsrCktFA AmbientAirDefault		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Manifold Pressure	> a threshold in kPa as a function of engine speed See table "TIAP-MAP Correlation Min MAP"				
			AND Filtered Mass Air Flow - Mass Air Flow	< 3.0 gm/sec				
			Low Engine Air Flow is TRUE when Mass Air Flow	< a threshold in gm/sec as a function of engine speed See table "TIAP-Baro Correlation Max Air Flow"				
			AND Manifold Pressure	< a threshold in kPa as a function of engine speed See table "TIAP-Baro Correlation Max MAP"				
			AND Mass Air Flow - Filtered Mass Air Flow	< 2.0 gm/sec				
			<u>Engine Not Rotating Case:</u> Manifold Pressure OR	< 50.0 kPa	Time between current ignition cycle and the		4 failures out of 5 samples	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Manifold Pressure	> 115.0 kPa	last time the engine was running Engine is not rotating No Active DTCs: No Pending DTCs:	> 10.0 seconds EngModeNotRunTmErr MAP_SensorFA TC_BoostPresSnsrCktFA AAP2_SnsrFA MAP_SensorCircuitFP AAP_SnsrCktFP AAP2_SnsrCktFP	1 sample every 12.5 msec	
Manifold Absolute Pressure Sensor Circuit Low	P0107	Detects a continuous short to low or open in either the signal circuit or the MAP sensor.	MAP Voltage	< 9.0 % of 5 Volt Range (0.5 Volts = 5.8 kPa)	Continuous		320 failures out of 400 samples 1 sample every 12.5 msec	Type B 2 trips
Manifold Absolute Pressure Sensor Circuit High	P0108	Detects an open sensor ground or continuous short to high in either the signal circuit or the MAP sensor.	MAP Voltage	> 78.0 % of 5 Volt Range (3.9 Volts = 299.0 kPa)	Continuous		320 failures out of 400 samples 1 sample every 12.5 msec	Type B 2 trips
Intake Air Temperature Sensor Circuit Performance	P0111	Detects an IAT sensor that has stuck in range by comparing to IAT2 and engine coolant temperature at startup	ABS(Power Up IAT - Power Up IAT2) AND ABS(Power Up ECT – Power Up IAT) > ABS(Power Up ECT – Power Up IAT2)	> 20 deg C	Time between current ignition cycle and the last time the engine was running No Active DTCs:	> 28800 seconds ECT_Sensor_Ckt_FA IAT_SensorCircuitFA IAT2_SensorCircuitFA	Executes once at the beginning of each ignition cycle if enable conditions are met	Type B 2 trips
Intake Air Temperature Sensor Circuit	P0112	Detects a continuous short to ground in the IAT signal circuit or the	Raw IAT Input	< 58 Ohms (~150 deg C)	Engine Run Time	> 0.0 seconds	40 failures out of 50 samples	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Low (High Temperature)		IAT sensor					1 sample every 100 msec	
Intake Air Temperature Sensor Circuit High (Low Temperature)	P0113	Detects a continuous open circuit in the IAT signal circuit or the IAT sensor	Raw IAT Input	> 142438 Ohms (~-60 deg C)	Engine Run Time	> 0.0 seconds	40 failures out of 50 samples 1 sample every 100 msec	Type B 2 trips
Intake Air Temperature Sensor Intermittent In-Range	P0114	Detects a noisy or erratic IAT signal circuit or IAT sensor	Change in IAT reading between consecutive 100 millisecond samples Change in IAT is multiplied by IAT Intermittent Weight Factor based on Filtered IAT. Filtered IAT = 0.10 * Current IAT + 0.90 * Filtered IAT from 100 milliseconds before	> 10 DegC	Continuous		20 failures out of 200 samples 1 sample every 100 msec	Type B 2 trips
Engine Coolant Temperature (ECT) Sensor Performance	P0116	This DTC detects ECT temp sensor stuck in mid range.	A failure will be reported if any of the following occur: 1) ECT at power up > IAT at power up by an IAT based table lookup value after a minimum 25200 second soak (fast fail). 2) ECT at power up > IAT at power up by 15.8 C after a minimum 25200 second	See "P0116: Fail if power up ECT exceeds IAT by these values" in the Supporting tables section	No Active DTC's Non-volatile memory initization Test complete this trip Test aborted this trip IAT LowFuelCondition Diag	VehicleSpeedSensor_FA IAT_SensorFA ECT_Sensor_Ckt_FA IgnitionOffTimeValid TimeSinceEngineRunningValid = Not occurred = False = False ≥ -7 ºC = False	1 failure 500 msec/ sample Once per valid cold start	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			soak and a block heater has not been detected. 3) ECT at power up > IAT at power up by 15.8 C after a minimum 25200 seconds soak and the time spent cranking the engine without starting is greater than 10.0 seconds with the LowFuelConditionDiag	= False	**Block Heater detection is enabled when either of the following occurs:** 1) ECT at power up > IAT at power up by 2) Cranking time **Block Heater is detected and diagnostic is aborted when 1) or 2) occurs. Diagnostic is aborted when 3) or 4) occurs:** 1a) Vehicle drive time 1b) Vehicle speed 1c) Additional Vehicle drive time is provided to 1a when Vehicle speed is below 1b as follows: 1d) IAT drops from power up IAT 2a) ECT drops from power up ECT 2b) Engine run time 3) Engine run time with vehicle speed below 1b 4) Minimum IAT during test	 > 15.8 ºC < 10.0 Seconds > 400 Seconds with > 14.9 MPH 0.50 times the seconds with vehicle speed below 1b ≥ 5.3 ºC > 5 ºC Within > 30 Seconds > 1800 Seconds ≤ -7 ºC		
Engine Coolant Temp Sensor Circuit Low	P0117	Circuit Continuity This DTC detects a short to ground in the ECT signal circuit or the ECT sensor.	ECT Resistance (@ 150ºC)	< 46 Ohms			5 failures out of 6 samples 1 sec/ sample	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
							Continuous	
Engine Coolant Temp Sensor Circuit High	P0118	Circuit Continuity This DTC detects a short to high or open in the ECT signal circuit or the ECT sensor.	ECT Resistance (@ -60ºC)	> 419000 Ohms	Engine run time Or IAT min	> 10.0 seconds ≥ -7.0 °C	5 failures out of 6 samples 1 sec/ sample Continuous	2 trips Type B
Engine Coolant Temperature (ECT) Sensor Circuit Intermittent	P0119	Circuit Continuity This DTC detects large step changes in the ECT signal circuit or the ECT sensor. Allowable high and low limits are calculated for the next sample based on the previous sample.	ECT temperature step change: 1) postive step change is greater than high limit OR 2) negitive step change is lower than low limit.		No Active DTC's	P0117 P0118	3 failures out of 4 samples 1 sec/ sample Continuous	2 trips Type B
Throttle Position Sensor Performance	P0121	Determines if the Throttle Position Sensor input is stuck within the normal operating range	See table "Turbocharger Intake Flow Rationality Diagnostic Failure Matrix" for combinations of model failures that can set this DTC. MAF model fails when		Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together)	>= 400 RPM <= 6000 RPM > -7 Deg C < 125 Deg C > -20 Deg C < 125 Deg C >= 0.00	Continuous Calculation are performed every 12.5 msec	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			ABS(Measured Flow – Modeled Air Flow) Filtered	> 20 grams/sec		Modeled Air Flow Error multiplied by MAF Residual Weight Factor based on RPM and MAF Residual Weight Factor Based on MAF Est		
			MAP1 model fails when ABS(Measured MAP – MAP Model 1) Filtered	> 24.0 kPa		MAP Model 1 Error multiplied by MAP1 Residual Weight Factor based on RPM		
			MAP2 model fails when ABS(Measured MAP – MAP Model 2) Filtered	> 22.0 kPa		MAP Model 2 Error multiplied by MAP2 Residual Weight Factor based on RPM		
			MAP3 model fails when ABS(Measured MAP – MAP Model 3) Filtered	> 22.0 kPa		MAP Model 3 Error multiplied by MAP Residual Weight Factor based on RPM		
			TIAP1 model fails when ABS(Measured TIAP – TIAP Model 1) Filtered	> 24.0 kPa		TIAP Model 1 Error multiplied by TIAP Residual Weight Factor based on RPM		
			TPS model fails when Filtered Throttle Model Error	> 200 kPa*(g/s)		Filtered Throttle Model Error multiplied by TPS Residual Weight Factor based on RPM See table "IFRD Residual Weighting Factors".		
			TIAP Correlation model fails when High Engine Air Flow is TRUE AND Measured TIAP - measured MAP - offset as a function of engine speed	> 24.0 kPa	No Active DTCs:	MAP_SensorCircuitFA EGRValve_FP EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA ECT_Sensor_Ckt_FP		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			See table "TIAP-MAP Correlation Offset" OR Low Engine Air Flow is TRUE AND Measured TIAP - measured Baro - offset as a function of engine speed	 > 24.0 kPa		IAT_SensorFA IAT_SensorCircuitFP IAT2_SensorFA IAT2_SensorCircuitFP TC_BoostPresSnsrCktFA AmbientAirDefault		
			See table "TIAP-Baro Correlation Offset" TIAP Correlation is valid when High Engine Air Flow has been TRUE for a period of time	 > 1.0 seconds				
			OR High Engine Air Flow has been TRUE for a period of time	 > 1.0 seconds				
			High Engine Air Flow is TRUE when Mass Air Flow	 > a threshold in gm/sec as a function of engine speed See table "TIAP-MAP Correlation Min Air Flow"				
			AND Manifold Pressure	 > a threshold in kPa as a function of engine speed				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
				See table "TIAP-MAP Correlation Min MAP"				
			AND Filtered Mass Air Flow - Mass Air Flow	< 3.0 gm/sec				
			Low Engine Air Flow is TRUE when					
			Mass Air Flow	< a threshold in gm/sec as a function of engine speed				
				See table "TIAP-Baro Correlation Max Air Flow"				
			AND Manifold Pressure	< a threshold in kPa as a function of engine speed				
				See table "TIAP-Baro Correlation Max MAP"				
			AND Mass Air Flow - Filtered Mass Air Flow	< 2.0 gm/sec				
TPS1 Circuit Low	P0122	Detects a continuous or intermittent short or open in TPS1 circuit	TPS1 Voltage <	0.325		Run/Crank voltage or Powertrain relay voltage > 6.41 and reduced power is false, else the failure will be reported for all conditions	79/159 counts; 57 counts continuous; 3.125 ms /count in the ECM main processor	Trips: 1 Type: A MIL: YES

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						No 5V reference error or fault for # 4 5V reference circuit (P06A3)		
TPS1 Circuit High	P0123	Detects a continuous or intermittent short or open in TPS1 circuit	TPS1 Voltage >	4.75		Run/Crank voltage or Powertrain relay voltage > 6.41 and reduced power is false, else the failure will be reported for all conditions No 5V reference error or fault for # 4 5V reference circuit (P06A3)	79/159 counts; 57 counts continuous; 3.125 ms /count in the ECM main processor	Trips: 1 Type: A MIL: YES
Engine Coolant Temperature Below Stat Regulating Temperature	P0128	This DTC detects if the engine coolant temperature rises too slowly due to an ECT or Cooling system fault.	Total energy transferred to the engine cooling system is greater than the predicted energy before: Range #1 (Primary) ECT reaches 69.0 °C when IAT min is < 52.0°C and ≥ 10.0°C. Range #2 (Alternate) ECT reaches 55.0 °C when IAT min is < 10.0°C and ≥ -7.0°C.	See "P0128: Maximum Total Energy transferred to Cooling System for IAT and Start-up ECT conditions" in the Supporting tables section.	No Active DTC's Engine not run time Engine run time Fuel Condition **Range #1 (Primary) Test** ECT at start run Average Cooling System Energy Vehicle Speed **Range #2 (Alternate) Test** ECT at start run	MAP_SensorFA MAF_SensorFA TPS_Performance_FA TPS_FA TPS_ThrottleAuthorityDefaulted IAT_SensorFA ECT_Sensor_Ckt_FA ECT_Sensor_Perf_FA VehicleSpeedSensor_FA EngineTorqueInaccurate ≥ 1800 seconds ≥ 120 seconds Ethanol ≤ 87% ≤ 64.0 °C ≥ 5.0 kW > 5 mph for at least 0.9 miles ≤ 50.0 °C	30 failures to set DTC 1 sec/ sample Once per ignition key cycle	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Average Cooling System Energy	≥ 5.0 kW		
					Vehicle Speed	> 5 mph for at least 0.9 miles		
					Cooling System Energy Adjustments			
					1) Max. cooling system power when accumulating energy	30.0 kW		
					2) When Cooling system power is < 8.0 kW then it is set to	0.0 kW		
					3) With Decel Fuel Cut Off active, Cooling System energy is reduced by multiplying actual power by	0.20 times		
					4) With Hybrid Engine Off Active, Cooling System Energy is reduced by	1.00 kW each second		
					Diagnostic will restart (using the lower value) if ECT drops	≥ 5.0°C below previous minimum ECT		
O2S Circuit Low Voltage Bank 1 Sensor 1	P0131	This DTC determines if the O2 sensor circuit is shorted to low.	Oxygen Sensor Signal	< 50 mVolts	No Active DTC's	TPS_ThrottleAuthorityDefaulted MAP_SensorFA AIR System FA Ethanol Composition Sensor FA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA	300 failures out of 375 samples Frequency: Continuous in 100 milli - second loop	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA		
					AIR intrusive test	= Not active		
					Fuel intrusive test	= Not active		
					Idle intrusive test	= Not active		
					EGR intrusive test	= Not active		
					System Voltage	10.0 < Volts < 32.0		
					EGR Device Control	= Not active		
					Idle Device Control	= Not active		
					Fuel Device Control	= Not active		
					AIR Device Control	= Not active		
					Low Fuel Condition			
					Diag	= False		
					Equivalence Ratio	0.9912 < ratio < 1.0400		
					Air Per Cylinder	20 < mgram < 1000		
					Fuel Control State	= Closed Loop		
					Closed Loop Active	= TRUE		
					All Fuel Injectors for active Cylinders	Enabled (On)		
					Fuel Condition	Ethanol ≤ 87%		
					Fuel State	DFCO not active		
					All of the above met for	> 5.0 seconds		
O2S Circuit High Voltage Bank 1 Sensor 1	P0132	This DTC determines if the O2 sensor circuit is shorted to high.	Oxygen Sensor Signal	> 1050 mvolts	**Open Test Criteria**		100 failures out of 125 samples Frequency: Continuous in 100 milli - second loop	2 trips Type B
					No Active DTC's	TPS_ThrottleAuthorityDefaulted MAF_SensorFA EthanolCompositionSensor_FA		
					System Voltage	10.0 < Volts < 32.0		
					AFM Status	= All Cylinders active		
					Heater Warm-up delay	= Complete		
					Engine Run Time	> 5 seconds		
					Engine Run Accum	> 150 seconds		
					Fuel Condition	≤ 87 % Ethanol		
					No Active DTC's	MAP_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA AIR System FA		
					Low Fuel Condition Diag	= False		
					Fuel Condition	≤ 87 % Ethanol		
					Initial delay after Open Test Criteria met (cold start condition)	> 40.0 seconds when engine soak time > 28800 seconds		
					Initial delay after Open Test Criteria met (not cold start condition)	> 40.0 seconds when engine soak time ≤ 28800 seconds		
					Equivalence Ratio	0.9912 ≤ ratio ≤ 1.0400		
					Air Per Cylinder	20.0 ≤ mgram ≤ 1200.0		
					Fuel Control State	not = Power Enrichment		
					All of the above met for	> 5.0 seconds		
O2S Slow Response Bank 1 Sensor 1	P0133	This DTC determines if the O2 sensor response time is degraded.	The average response time is caluclated over the test time, and compared to the threshold. Refer to **"P0133 - O2S Slow Response Bank 1 Sensor 1"** Pass/Fail Threshold table in the Supporting Tables tab.		No Active DTC's	TPS_ThrottleAuthorityDefaulted MAP_SensorFA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault MAF_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA AIR System FA EthanolCompositionSensor_FA EngineMisfireDetected_FA P0131 P0132 P0134	Sample time is 60 seconds Frequency: Once per trip	2 trips Type B
					System Voltage	10.0 < Volts < 32.0		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					EGR Device Control	= Not active		
					Idle Device Control	= Not active		
					Fuel Device Control	= Not active		
					AIR Device Control	= Not active		
					Low Fuel Condition Diag	= False		
					Green O2S Condition	= Not Valid, See definition of **Green Sensor Delay Criteria (B1S1)** in Supporting Tables tab.		
					O2 Heater on for	≥ 40 seconds		
					Learned Htr resistance	= Valid		
					Engine Coolant	> 69 ºC		
					IAT	> -40 ºC		
					Engine run Accum	> 60 seconds		
					Time since any AFM status change	> 2.0 seconds		
					Time since Purge On to Off change	> 0.0 seconds		
					Time since Purge Off to On change	> 1.5 seconds		
					Purge duty cycle	≥ 0 % duty cycle		
					Engine airflow	10 ≤ grams per second ≤ 50		
					Engine speed	1000 <= RPM <= 3500		
					Fuel	< 87 % Ethanol		
					Baro	> 70 kpa		
					Air Per Cylinder	≥ 100 mGrams		
					Low Fuel Condition Diag	= False		
					Fuel Control State	= Closed Loop		
					Closed Loop Active	= TRUE		
					LTM fuel cell	= Enabled		
					Transient Fuel Mass	≤ 100.0 mgrams		
					Baro	= Not Defaulted		
					Fuel Control State	not = Power Enrichment		
					Fuel State	DFCO not active		
					Commanded Proportional Gain	≥ 0.0 %		
					All of the above met for	> 3.0 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
O2S Circuit Insufficient Activity Bank 1 Sensor 1	P0134	This DTC determines if the O2 sensor circuit is open.	Oxygen Sensor Signal	> 1700 mvolts	No Active DTC's System Voltage AFM Status Heater Warm-up delay Engine Run Time Engine Run Accum Fuel	 TPS_ThrottleAuthorityDefaulted MAF_SensorFA EthanolCompositionSensor_FA 10.0 < Volts < 32.0 = All Cylinders active = Complete > 5 seconds > 150 seconds ≤ 87 % Ethanol	100 failures out of 125 samples. Frequency: Continuous 100msec loop	2 trips Type B
O2S Heater Performance Bank 1 Sensor 1	P0135	This DTC determines if the O2 sensor heater is functioning properly by monitoring the current through the heater circuit.	Heater Current	0.3 < Amps < 2.5	No Active DTC's System Voltage Heater Warm-up delay O2S Heater device control B1S1 O2S Heater Duty Cycle **All of the above met for**	 ECT_Sensor_FA 10.0 < Volts < 32.0 = Complete = Not active > zero > 120 seconds	8 failures out of 10 samples Frequency: 2 tests per trip 30 seconds delay between tests and 1 second execution rate	2 trips Type B
O2S Circuit Low Voltage Bank 1 Sensor 2	P0137	This DTC determines if the O2 sensor circuit is shorted to low.	Oxygen Sensor Signal	< 50 mvolts	No Active DTC's AIR intrusive test Fuel intrusive test	TPS_ThrottleAuthorityDefaulted MAP_SensorFA AIR System FA Ethanol Composition Sensor FA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA = Not active = Not active	350 failures out of 437 samples Frequency: Continuous in 100 milli - second loop	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Idle intrusive test	= Not active		
					EGR intrusive test	= Not active		
					System Voltage	10.0 < Volts < 32.0		
					EGR Device Control	= Not active		
					Idle Device Control	= Not active		
					Fuel Device Control	= Not active		
					AIR Device Control	= Not active		
					Low Fuel Condition			
					Diag	= False		
					Equivalence Ratio	0.9912 ≤ ratio ≤ 1.0400		
					Air Per Cylinder	20 ≤ mgrams ≤ 1000		
					Fuel Control State	= Closed Loop		
					Closed Loop Active	= TRUE		
					All Fuel Injectors for active Cylinders	Enabled (On)		
					Fuel Condition	Ethanol <= 87%		
					Fuel State	DFCO not active		
					All of the above met for	> 5.0 seconds		
O2S Circuit High Voltage Bank 1 Sensor 2	P0138	This DTC determines if the O2 sensor circuit is shorted to high.	Oxygen Sensor Signal	> 1050 mvolts	**Open Test Criteria**		100 failures out of 125 samples Frequency: Continuous in 100 milli - second loop	2 trips Type B
					No Active DTC's	TPS_ThrottleAuthorityDefaulted MAF_SensorFA EthanolCompositionSensor_FA		
					System Voltage	10.0 < Volts < 32.0		
					AFM Status	= All Cylinders active		
					Heater Warm-up delay	= Complete		
					Engine Run Time	> 5 seconds		
					Fuel Condition	≤ 87 % Ethanol		
					No Active DTC's	MAP_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA AIR System FA		
					Low Fuel Condition			
					Diag	= False		
					Fuel Condition	≤ 87 % Ethanol		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Initial delay after Open Test Criteria met (cold start condition)	> 40.0 seconds when engine soak time > 28800 seconds		
					Initial delay after Open Test Criteria met (not cold start condition)	> 40.0 seconds when engine soak time ≤ 28800 seconds		
					Equivalence Ratio	0.9912 ≤ ratio ≤ 1.0400		
					Air Per Cylinder	20 ≤ mgrams ≤ 1200		
					Fuel Control State	not = Power Enrichment		
					All of the above met for	> 5.0 seconds		
O2 Sensor Slow Response Rich to Lean Bank 1 Sensor 2	P013A	This DTC determines if the post catalyst O2 sensor has Slow Response in a predefined Rich to Lean voltages range during Rich to Lean transition. The diagnostic is an intrusive test which runs in a DFCO mode to achieve the required response.	The EWMA of the Post O2 sensor normalized integral value OR The Accumulated mass air flow monitored during the Slow Response Test (between the upper and lower voltage thresholds)	> 8.0 units > 15 grams (upper threshold is 450 mvolts and lower threshold is 150 mvolts)	No Active DTC's	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed.	1 trips Type A EWMA
					B1S2 Failed this key cycle	P013B, P013E, P013F, P2270 or P2271		
					System Voltage	10.0 < Volts < 32.0		
					Learned heater resistance	= Valid		
					ICAT MAT Burnoff delay	= Not Valid		
					Green O2S Condition	= Not Valid, See definition of **Green Sensor Delay Criteria (B1S2)** in Supporting Tables tab.		
					Low Fuel Condition Diag	= False		
					Post fuel cell	= enabled		
					DTC's Passed	P2270 (and P2272 if applicable)		
					DTC's Passed			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						P013E (and P014A if applicable)		
					After above conditions are met: DFCO mode is continued (wo driver initiated pedal input).			
O2 Sensor Slow Response Lean to Rich Bank 1 Sensor 2	P013B	This DTC determines if the post catalyst O2 sensor has Slow Response in a predefined Lean to Rich voltages range during Lean to Rich transition. The diagnostic is an intrusive test which increases the delivered A/F ratio to achieve the required rich threshold.	The EWMA of the Post O2 sensor normalized integral value OR The Accumulated mass air flow monitored during the Slow Response Test (between the upper and lower voltage thresholds)	> 8.0 units > 148 grams (lower threshold is 350 mvolts and upper threshold is 600 mvolts)	No Active DTC's B1S2 Failed this key cycle System Voltage Learned heater resistance ICAT MAT Burnoff delay Green O2S Condition Low Fuel Condition Diag Post fuel cell DTC's Passed	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA P013A, P013E, P013F, P2270 or P2271 10.0 < Volts < 32.0 = Valid = Not Valid = Not Valid, See definition of **Green Sensor Delay Criteria (B1S2)** in Supporting Tables tab. = False = enabled P2270 (and P2272 if applicable) P013E (and P014A if applicable) P013A (and P013C if applicable) P2271 (and P2273 if applicable) P013F (and P014B if applicable)	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed.	1 trips Type A EWMA

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					After above conditions are met: Fuel Enrich mode continued.			
O2 Sensor Delayed Response Rich to Lean Bank 1 Sensor 2	P013E	This DTC determines if the post catalyst O2 sensor has an initial delayed response to an A/F change from Rich to Lean. The diagnostic is an intrusive test which runs in a DFCO mode to achieve the required response.	Post O2 sensor voltage AND The Accumulated mass air flow monitored during the Delayed Response Test	> 450 mvolts > 26 grams	No Active DTC's B1S2 Failed this key cycle System Voltage Learned heater resistance ICAT MAT Burnoff delay Green O2S Condition Low Fuel Condition Diag Post fuel cell DTC's Passed	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA P013A, P013B, P013F, P2270 or P2271 10.0 < Volts < 32.0 = Valid = Not Valid = Not Valid, See definition of **Green Sensor Delay Criteria (B1S2)** in Supporting Tables tab. = False = enabled P2270 (and P2272 if applicable)	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed.	2 trips Type B
					After above conditions are met: DFCO mode entered (wo driver initiated pedal input).			
O2 Sensor Delayed Response Lean to Rich Bank 1 Sensor 2	P013F	This DTC determines if the post catalyst O2 sensor has an initial delayed response to an A/F change from Lean to Rich. The diagnostic is an intrusive test which increases the delivered	Post O2 sensor voltage AND The Accumulated mass air flow monitored during the Delayed Response Test	< 350 mvolts	No Active DTC's	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_Rapi	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		A/F ratio to achieve the required rich threshold.		> 94 grams		FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA	dResponseActive = TRUE, multiple tests per trip are allowed	
					B1S2 Failed this key cycle	P013A, P013B, P013E, P2270 or P2271		
					System Voltage	10.0 < Volts < 32.0		
					Learned heater resistance	= Valid		
					ICAT MAT Burnoff delay	= Not Valid		
					Green O2S Condition	= Not Valid, See definition of **Green Sensor Delay Criteria (B1S2)** in Supporting Tables tab.		
					Low Fuel Condition Diag	= False		
					Post fuel cell DTC's Passed	= enabled P2270 (and P2272 if applicable) P013E (and P014A if applicable) P013A (and P013C if applicable) P2271 (and P2273 if applicable)		
					After above conditions are met: Fuel Enrich mode entered.			
O2S Circuit Insufficient Activity Bank 1 Sensor 2	P0140	This DTC determines if the O2 sensor circuit is open.	Oxygen Sensor Signal	> 1700 mvolts	No Active DTC's	TPS_ThrottleAuthorityDefaulted MAF_SensorFA EthanolCompositionSensor_FA	100 failures out of 125 samples. Frequency: Continuous 100msec loop	2 trips Type B
					System Voltage	10.0 <Volts < 32.0		
					AFM Status	= All Cylinders active		
					Heater Warm-up delay	= Complete		
					Engine Run Time	> 5 seconds		
					Engine Run Accum	> 150 seconds		
					Fuel	≤ 87 % Ethanol		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
O2S Heater Performance Bank 1 Sensor 2	P0141	This DTC determines if the O2 sensor heater is functioning properly by monitoring the current through the heater circuit.	Heater Current	0.3 > amps > 2.5	No Active DTC's System Voltage Heater Warm-up delay O2S Heater device control B1S1 O2S Heater Duty Cycle **All of the above met for** Time	ECT_Sensor_FA 10.0 < Volts < 32.0 = Complete = Not active > zero > 120 seconds	8 failures out of 10 samples Frequency: 2 tests per trip 30 seconds delay between tests and 1 second execution rate.	2 trips Type B
Fuel System Too Lean Bank 1	P0171	Determines if the fuel control system is in a lean condition, based on the filtered long-term fuel trim.	The filtered long-term fuel trim metric	>= 1.295	Engine speed BARO Coolant Temp MAP Inlet Air Temp MAF Fuel Level	450 <rpm< 6500 > 70 kPa -20 <°C< 150 10 <kPa< 255 -20 <°C< 150 1.0 <g/s< 512.0 > 10 % or if fuel sender is faulty	Frequency: 100 ms Continuous Loop Development data indicates that the Fuel Adjustment System Diagnostic (FASD) is typically enabled during 62% of the EPAIII drive cycle. This is also typical of real-world driving, however values will vary (higher or lower) based on the actual conditions present during the drive cycle.	2 Trip(s) Type B
					Long Term Fuel Trim data accumulation:	> 40.0 seconds of data must accumulate on each trip, with at least 30.0 seconds of data in the current fuel trim cell before a pass or fail decision can be made.		
					fuel trim diagnosed during decels? No			
					Long-Term Fuel Trim Cell Usage			
					Sometimes, certain Long-Term Fuel Trim Cells are not utilized for control or diagnosis. **Please see "Supporting Tables" Tab for a list of cells utilized for diagnosis.**			
					Fuel Control Status			
					Closed Loop Long Term FT	Enabled Enabled **Please see "Closed Loop Enable Criteria" and "Long Term FT Enable Criteria" in Supporting Tables.**		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Fuel Consumed	> 0.0 liters of fuel consumed after a fuel fill event		
					EGR Flow Diag. Intrusive Test Not Active Catalyst Monitor Intrusive Test Not Active Post O2 Diag. Intrusive Test Not Active Device Control Not Active EVAP Diag. “tank pull down” Not Active			
					No active DTCs: IAC_SystemRPM_FA MAP_SensorFA MAF_SensorFA MAF_SensorTFTKO AIR System FA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSensorCircuit_FA Ethanol Composition Sensor FA FuelInjectorCircuit_FA EngineMisfireDetected_FA EGRValvePerformance_FA EGRValveCircuit_FA MAP_EngineVacuumStatus AmbientAirDefault O2S_Bank_1_Sensor_1_FA			
Fuel System Too Rich Bank 1	P0172	Determines if the fuel control system is in a rich condition, based on the filtered long-term fuel trim metric. There are two methods to determine a Rich fault. They are Passive and Intrusive. The Intrusive test is	**Passive Test:** The filtered Non-Purge Long Term Fuel Trim metric	<= 0.705 (a Passive Test decision cannot be made when Purge is enabled)		Secondary Parameters and Enable Conditions are identical to those for P0171, with the exception that fuel level is not considered.	Frequency: 100 ms Continuous Loop Development data indicates that the Fuel Adjustment System Diagnostic	2 Trip(s) Type B
			Intrusive Test:					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		described below:	The filtered Purge Long Term Fuel Trim metric	<= 0.710			(FASD) is typically enabled during 62% of the EPAIII drive cycle. This is also typical of real-world driving, however values will vary (higher or lower) based on the actual conditions present during the drive cycle.	
			AND					
			The filtered Non-Purge Long Term Fuel Trim metric	<= 0.705 for 3 out of 5 intrusive segments				
		Intrusive Test: When the filtered Purge Long Term Fuel Trim metric is <= 0.710, purge is ramped off to determine if excess purge vapor is the cause of the rich condition. If the filtered Purge Long Term Fuel Trim metric > 0.710, the test passes without checking the filtered Non-Purge Long Term Fuel Trim metric. Performing intrusive tests too frequently may also affect EVAP and EPAIII emissions, and the execution frequency of other diagnostics.	Segment Def'n: Segments can last up to 42 seconds and are separated by the lesser of 10 seconds of purge-on time or enough time to purge 11 grams of vapor. A maximum of 5 completed segments or 15 attempts are allowed for each intrusive test. After an intrusive test report is completed, another intrusive test cannot occur for 300 seconds to allow sufficient time to purge excess vapors from the canister. During this period, fuel trim will pass if the filtered Purge-on Long Term fuel trim > Purge Rich Limit Table for at least 120					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			seconds, indicating that the canister has been purged.					
Fuel Composition Sensor Circuit Low	P0178	Detects Out of Range Low Frequency Signal	Flex Fuel Sensor Output Frequency	< 45 Hertz	Powertrain Relay	> 11.0 Volts < 32.0 Volts	50 failures out of 63 samples 100 ms loop Continuous	2 trip(s) Type B
Fuel Composition Sensor Circuit High	P0179	Detects Out of Range High Frequency Signal	Flex Fuel Sensor Output Frequency	> 155 Hertz <= 185 Hertz	Powertrain Relay	> 11.0 Volts < 32.0 Volts	50 failures out of 63 samples 100 ms loop Continuous	2 trip(s) Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
SIDI High Pressure Sensor Performance	P0191	This DTC detects a skewed fuel rail sensor via a comparison of measured pressure and commanded/modeled pressure				Enabled when a code clear is not active or not exiting device control Engine is not cranking		1 trips Type A
			Idle test (Low Side Fuel Pressure - High Side Fuel Pressure)	Enabled ≤ -0.600 MPa OR ≥ 0.300 MPa	Vehicle Speed Pedal Position = 0 for	<= 3.11 MPH 200 Counts (12.5ms per count)	Idle Test > = 240 counts (12.5ms per count)	
					Battery Voltage Low Pressure Fuel Pump Pressure Engine Run Time	11 <= Volts <= 32 ≥ 0.250 MPa ≥ KtFHPD_t_PumpCntrlEngRunThrsh (see supporting tables) Enabled when a code clear is not active or not exiting device control Engine is not cranking		
					Delay counts after pump is turned off	≥KtFHPD_Cnt_SnsPrfIdlePumpOff Dly(see supporting tables)	KtFHPD_Cnt_SnsPrfIdlePumpOff Dly runs in 12.5 ms loop	
			High Drive Test (Relief Pressure - Measured high Pressure)	Enabled ≤ -4.70 MPa	Engine Speed Desired High Side Pressure Vehicle Speed Battery Voltage Low Pressure Fuel Pump Pressure Engine Run Time	1000 <= RPM <= 3000 3 <= MPa <= 6 >= 18.64 MPH 11 <= Volts <= 32 ≥ 0.250 MPa ≥ KtFHPD_t_PumpCntrlEngRunThrsh (see supporting tables) Enabled when a code clear is not active or not exiting device control Engine is not cranking	High Drive Test >= 160 counts (12.5ms per count)	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Low Drive Test (Commanded high Pressure - Measured high Pressure)	Enabled ≥ 1.567 MPa	Engine Speed Desired High Side Pressure Vehicle Speed	1000 <= RPM <= 3000 3.00 <= MPa <= 6.00 >= 18.64 MPH	LoDrive Test >= 240 counts (12.5ms per count)	
			AND		Battery Voltage	11 <= Volts <= 32		
			Modeled Injection Pressure	≥ 1.57 MPa	Low Pressure Fuel Pump Pressure	≥ 0.250 MPa		
					Engine Run Time	≥ KtFHPD_t_PumpCntrlEngRunThrsh (see supporting tables) Enabled when a code clear is not active or not exiting device control Engine is not cranking		
			Sensor Stuck Test Measured High Pressure (max - min)	Enabled ≤ 0.100 MPa	Engine Speed Vehicle Speed	≥ 2000 ≥ 18.64 MPH Enabled when a code clear is not active or not exiting device control Engine is not cranking	Stuck Test Engine Run Time >= KtFHPD_t_PumpCntrlEngRunThrsh(See Supporting Tables) or Accumulating engine crank time >= KtFHPD_t_SnsPrfStuckCrankTmout(See Supporting Tables)	
					Additional Enable Conditions:			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						High Pressure Pump is enabled		
					Barometric Pressure			
					Inlet Air Temp	>= 70.0		
					Fuel Temp	>= -10.0		
						-10 ≤ Temp degC ≤ 100		
						Estimate fuel rail pressure is valid		
						Green Engine (In assembly plant) is not enabled		
						Not LowFuelConditionDiagnostic		
						Low side Fuel Pump is on		
						Injector Flow Test is not active		
						Device control commanded pressure is false		
						Device control pump ckt enabled on is false		
						Engine movement detected is true (Function of crankshaft and camshaft position)		
						Manufacturers enable counter is 0)		
						Clutch Disengaged (See Supporting Tables) or vehicle has automatic transmission		
						All cylinder are fuel enabled		
					DTC's not Active	FHPR_b_FRP_SnsrCkt_FA		
						FHPR_b_FRP_SnsrCkt_TFTKO		
						FHPR_b_PumpCkt_FA		
						FHPR_b_PumpCkt_TFTKO		
						CrankSensorFA		
						CamSensorFA		
						IAT_SensorFA		
						IAT2_SensorFA		
						ECT_Sensor_FA		
						FHPR_b_PumpCkt_FA		
						Ethanol Composition Sensor FA		
						PowertrainRelayFault		
						FuelInjectorCircuit_FA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						FuelInjectorCircuit_TFTKO IgnitionOutputDriver_FA EngineMisfireDetected_FA MAF_SensorFA MAP_SensorFA AcceleratorPedalFailure TPS_FA VehicleSpeedSensor_FA IAC_SystemRPM_FA		
High Pressure Sensor Out of Range Low	P0192	This DTC checks the circuit for electrical integrity during operation.	High Pressure Fuel Sensor	≤ 4 % of 5Vref	Battery Voltage	11 ≤ Volts ≤ 32 Engine Running	Both Run Continuously Engine Synchronouse Mode 800 failures out of 1000 samples Time Based Mode 400 failures out of 500 samples 6.25 ms Sample Continuous	1 trips Type A
High Pressure Sensor Out of Range High	P0193	This DTC checks the circuit for electrical integrity during operation.	High Pressure Fuel Sensor	≥ 96 % of 5Vref	Battery Voltage	11 ≤ Volts ≤ 32 Engine Running	Both Run Continuously Engine Synchronouse Mode 800 failures out of 1000 samples Time Based Mode 400 failures out of 500 samples 6.25 ms Sample Continuous	1 trips Type A

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Injector 1 Open Circuit	P0201	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the fuel injector 1 has determined to be an open circuit		Battery Voltage Engine Run Time	11 ≤ Volts ≤ 32 ≥ 5 Sec	10 failures out of 20 samples 100 ms /sample Continuous	1 trips Type A
Injector 2 Open Circuit	P0202	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the fuel injector 2 has determined to be an open circuit		Battery Voltage Engine Run Time	11 ≤ Volts ≤ 32 ≥ 5 Sec P062B not FA or TFTKO	10 failures out of 20 samples 100 ms /sample Continuous	1 trips Type A
Injector 3 Open Circuit	P0203	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the fuel injector has determined to be an open circuit		Battery Voltage Engine Run Time	11 ≤ Volts ≤ 32 ≥ 5 Sec P062B not FA or TFTKO	10 failures out of 20 samples 100 ms /sample Continuous	1 trips Type A
Injector 4 Open Circuit	P0204	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the fuel injector has determined to be an open circuit		Battery Voltage Engine Run Time	11 ≤ Volts ≤ 32 ≥ 5 Sec P062B not FA or TFTKO	10 failures out of 20 samples 100 ms /sample Continuous	1 trips Type A
TPS2 Circuit Low	P0222	Detects a continuous or intermittent short or open in TPS2 circuit	TPS2 Voltage <	0.25		Run/Crank voltage or Powertrain relay voltage > 6.41 and reduced power is false, else the failure will be reported for all conditions No 5V reference error or fault for # 4 5V reference circuit (P06A3)	79/159 counts; 57 counts continuous; 3.125 ms /count in the ECM main processor	Trips: 1 Type: A MIL: YES
TPS2 Circuit High	P0223	Detects a continuous or intermittent short or open in TPS2 circuit	TPS2 Voltage >	4.59		Run/Crank voltage or Powertrain relay voltage > 6.41 and reduced power is false, else the failure will be reported for all conditions No 5V reference error or fault for # 4 5V reference circuit (P06A3)	79/159 counts; 57 counts continuous; 3.125 ms /count in the ECM main processor	Trips: 1 Type: A MIL: YES

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Turbo/Super Charger Engine Overboost	P0234	Detect Negative Boost Pressure Control Deviation	Desired Boost Pressure - Actual Boost Pressure	< (KtBSTD_p_CntrlDev NegLim - KtBSTD_p_CntrlDev AmbAirCorr) See Tables in Supporting Tables Sheet	Diagnosis Enabled Engine Speed Engine Speed Desired Boost Pressure Desired Boost Pressure Desired Boost Pressure Derivative Desired Boost Pressure Derivative Ambient Pressure Ambient Pressure Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Wait for steady state: No Active DTCs: Not in Device Control for:	Enabled > 1600 rpm < 6000 rpm > 140.0 kPa < 300.0 kPa > -75.0 kPa/s < 75.0 kPa/s > 60.0 kPa < 120.0 kPa > -40.0 Deg C < 120.0 Deg C > -40.0 Deg C < 80.0 Deg C 0.8 seconds Desired Boost Pressure > Basic Pressure AmbientAirDefault BSTR_b_PCA_CktFA BSTR_b_TurboBypassCktFA ECT_Sensor_FA IAT_SensorFA BSTR_b_ExcsvBstTFTKO BSTR_b_PCA_CktTFTKO TC_BoostPresSnsrFA AnyCamPhaser_FA BSTR_b_PresCntrlTooLoTFTKO BSTR_b_PresCntrlTooHiTFTKO EnginePowerLimited Wastegate Control Bypass control	15 failures out of 15 samples 1 sample every 100ms	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Turbocharger Boost Pressure (TIAP) Sensor Performance	P0236	Determines if the Turbocharger Boost (TIAP) Pressure Sensor input is stuck within the normal operating range	See table "Turbocharger Intake Flow Rationality Diagnostic Failure Matrix" for combinations of model failures that can set this DTC.		Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together)	>= 400 RPM <= 6000 RPM > -7 Deg C < 125 Deg C > -20 Deg C < 125 Deg C	Continuous Calculation are performed every 12.5 msec	Type B 2 trips
			MAF model fails when			>= 0.00		
			ABS(Measured Flow – Modeled Air Flow) Filtered	> 20 grams/sec		Modeled Air Flow Error multiplied by MAF Residual Weight Factor based on RPM and MAF Residual Weight Factor Based on MAF Est		
			MAP1 model fails when					
			ABS(Measured MAP – MAP Model 1) Filtered	> 24.0 kPa		MAP Model 1 Error multiplied by MAP1 Residual Weight Factor based on RPM		
			MAP2 model fails when					
			ABS(Measured MAP – MAP Model 2) Filtered	> 22.0 kPa		MAP Model 2 Error multiplied by MAP2 Residual Weight Factor based on RPM		
			MAP3 model fails when					
			ABS(Measured MAP – MAP Model 3) Filtered	> 22.0 kPa		MAP Model 3 Error multiplied by MAP Residual Weight Factor based on RPM		
			TIAP1 model fails when					
			ABS(Measured TIAP – TIAP Model 1) Filtered	> 24.0 kPa		TIAP Model 1 Error multiplied by TIAP Residual Weight Factor based on RPM		
			TPS model fails when			Filtered Throttle Model Error multiplied by TPS Residual Weight Factor based on RPM		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Filtered Throttle Model Error	> 200 kPa*(g/s)				
			TIAP Correlation model fails when			See table "IFRD Residual Weighting Factors".		
			High Engine Air Flow is TRUE AND Measured TIAP - measured MAP - offset as a function of engine speed See table "TIAP-MAP Correlation Offset"	> 24.0 kPa	No Active DTCs:	MAP_SensorCircuitFA EGRValve_FP EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA ECT_Sensor_Ckt_FP IAT_SensorFA IAT_SensorCircuitFP IAT2_SensorFA IAT2_SensorCircuitFP TC_BoostPresSnsrCktFA AmbientAirDefault		
			OR Low Engine Air Flow is TRUE AND Measured TIAP - measured Baro - offset as a function of engine speed See table "TIAP-Baro Correlation Offset"	> 24.0 kPa				
			TIAP Correlation is valid when					
			High Engine Air Flow has been TRUE for a period of time	> 1.0 seconds				
			OR High Engine Air Flow has been TRUE for a period of time	> 1.0 seconds				
			High Engine Air Flow is TRUE when					
			Mass Air Flow	> a threshold in				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
				gm/sec as a function of engine speed See table "TIAP-MAP Correlation Min Air Flow"				
			AND Manifold Pressure	> a threshold in kPa as a function of engine speed See table "TIAP-MAP Correlation Min MAP"				
			AND Filtered Mass Air Flow - Mass Air Flow	< 3.0 gm/sec				
			Low Engine Air Flow is TRUE when Mass Air Flow	< a threshold in gm/sec as a function of engine speed See table "TIAP-Baro Correlation Max Air Flow"				
			AND Manifold Pressure	< a threshold in kPa as a function of engine speed See table "TIAP-Baro Correlation Max MAP"				
			AND Mass Air Flow - Filtered Mass Air Flow					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
				< 2.0 gm/sec				
			<u>Engine Not Rotating Case:</u>					
			Turbocharger Boost Pressure OR Turbocharger Bosst Pressure	< 50.0 kPa > 115.0 kPa	Time between current ignition cycle and the last time the engine was running Engine is not rotating	> 10.0 seconds	4 failures out of 5 samples 1 sample every 12.5 msec	
					No Active DTCs: No Pending DTCs:	EngModeNotRunTmErr MAP_SensorFA TC_BoostPresSnsrCktFA AAP2_SnsrFA MAP_SensorCircuitFP AAP_SnsrCktFP AAP2_SnsrCktFP		
Turbocharger Boost Pressure Sensor Circuit Low	P0237	Detects a continuous short to low or open in either the signal circuit or the turbocharger boost pressure sensor.	Turbocharger Boost Pressure Voltage	< 18.0 % of 5 Volt Range (0.9 Volts = 44.0 kPa)	Engine Run Time	> 0.00 seconds	320 failures out of 400 samples 1 sample every 12.5 msec	Type B 2 trips
Turbocharger Boost Pressure Sensor Circuit High	P0238	Detects an open sensor ground or continuous short to high in either the signal circuit or the turbocharger boost pressure sensor.	Turbocharger Boost Pressure Voltage	> 78.0 % of 5 Volt Range (3.9 Volts = 299.0 kPa)	Engine Run Time	> 0.00 seconds	320 failures out of 400 samples 1 sample every 12.5 msec	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Turbocharger Wastegate / Supercharger Boost Solenoid A Control Circuit	P0243	Detect Turbocharger Boost Solenoid -Open Circuit	ECM detects that commanded and actual states of output driver do not match because the output is open circuit		Diagnosis Enabled Powertrain relay Voltage Powertrain relay Voltage Ignition run crank voltage Ignition run crank voltage Engine is not cranking	Enabled >= 11.00 Volts <= 32.00 Volts >= 2.00 Volts <= 6.00 Volts	10 failures out of 20 samples 1 sample every 100ms	Type B 2 trips
Turbocharger Wastegate / Supercharger Boost Solenoid A Control Circuit Low	P0245	Detect Turbocharger Boost Solenoid - Shorted to ground	ECM detects that commanded and actual states of output driver do not match because the output is shorted to ground		Diagnosis Enabled Powertrain relay Voltage Powertrain relay Voltage Ignition run crank voltage Ignition run crank voltage Engine is not cranking	Enabled >= 11.00 Volts <= 32.00 Volts >= 2.00 Volts <= 6.00 Volts	10 failures out of 20 samples 1 sample every 100ms	Type B 2 trips
Turbocharger Wastegate / Supercharger Boost Solenoid A Control Circuit High	P0246	Detect Turbocharger Boost Solenoid - Shorted to Power	ECM detects that commanded and actual states of output driver do not match because the output is shorted to power		Diagnosis Enabled Powertrain relay Voltage Powertrain relay Voltage Ignition run crank voltage Ignition run crank voltage Engine is not cranking	Enabled >= 11.00 Volts <= 32.00 Volts >= 2.00 Volts <= 6.00 Volts	10 failures out of 20 samples 1 sample every 100ms	Type B 2 trips
Injector 1 Low side circuit shorted to ground	P0261	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the fuel injector low side is shorted to ground		Battery Voltage Engine Run Time	11 ≤ Volts ≤ 32 ≥ 5 Sec P062B not FA or TFTKO	10 failures out of 20 samples 100 ms /sample Continuous	1 trips Type A

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Injector 1 Low side circuit shorted to power	P0262	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the fuel injector low side is shorted to power		Battery Voltage Engine Run Time	11 ≤ Volts ≤ 32 ≥ 5 Sec P062B not FA or TFTKO	10 failures out of 20 samples 100 ms /sample Continuous	1 trips Type A
Injector 2 Low side circuit shorted to ground	P0264	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the fuel injector 2 low side is shorted to ground		Battery Voltage Engine Run Time	11 ≤ Volts ≤ 32 ≥ 5 Sec P062B not FA or TFTKO	10 failures out of 20 samples 100 ms /sample Continuous	1 trips Type A
Injector 2 Low side circuit shorted to power	P0265	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the fuel injector low side is shorted to power		Battery Voltage Engine Run Time	11 ≤ Volts ≤ 32 ≥ 5 Sec P062B not FA or TFTKO	10 failures out of 20 samples 100 ms /sample Continuous	1 trips Type A
Injector 3 Low side circuit shorted to ground	P0267	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the fuel injector low side is shorted to ground		Battery Voltage Engine Run Time	11 ≤ Volts ≤ 32 ≥ 5 Sec P062B not FA or TFTKO	10 failures out of 20 samples 100 ms /sample Continuous	1 trips Type A
Injector 3 Low side circuit shorted to power	P0268	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the fuel injector low side is shorted to power		Battery Voltage Engine Run Time	11 ≤ Volts ≤ 32 ≥ 5 Sec P062B not FA or TFTKO	10 failures out of 20 samples 100 ms /sample Continuous	1 trips Type A
Injector 4 Low side circuit shorted to ground	P0270	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the fuel injector low side is shorted to ground		Battery Voltage Engine Run Time	11 ≤ Volts ≤ 32 ≥ 5 Sec P062B not FA or TFTKO	10 failures out of 20 samples 100 ms /sample Continuous	1 trips Type A
Injector 4 Low side circuit shorted to power	P0271	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the fuel injector low side is shorted to power		Battery Voltage Engine Run Time	11 ≤ Volts ≤ 32 ≥ 5 Sec P062B not FA or TFTKO	10 failures out of 20 samples 100 ms /sample Continuous	1 trips Type A
Turbo/Super Charger Engine Underboost	P0299	Detect Positive Boost Pressure Control Deviation	Desired Boost Pressure - Actual Boost Pressure	> (KtBSTD_p_CntrlDev PosLim + KtBSTD_p_CntrlDev AmbAirCorr)	Diagnosis Enabled Engine Speed Engine Speed Desired Boost Pressure	Enabled > 1600 rpm < 6000 rpm > 140.0 kPa	15 failures out of 15 samples 1 sample every 100ms	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
				See Tables in Supporting Tables Sheet	Desired Boost Pressure	< 300.0 kPa		
					Desired Boost Pressure Derivative	> -75.0 kPa/s		
					Desired Boost Pressure Derivative	< 75.0 kPa/s		
					Ambient Pressure	> 60.0 kPa		
					Ambient Pressure	< 120.0 kPa		
					Coolant Temp	> -40.0 Deg C		
					Coolant Temp	< 120.0 Deg C		
					Intake Air Temp	> -40.0 Deg C		
					Intake Air Temp	< 80.0 Deg C		
					Wait for steady state:	0.8 seconds		
						Desired Boost Pressure > Basic Pressure		
					No Active DTCs:	AmbientAirDefault BSTR_b_PCA_CktFA BSTR_b_TurboBypassCktFA ECT_Sensor_FA IAT_SensorFA BSTR_b_ExcsvBstTFTKO BSTR_b_PCA_CktTFTKO TC_BoostPresSnsrFA AnyCamPhaser_FA BSTR_b_PresCntrlTooLoTFTKO BSTR_b_PresCntrlTooHiTFTKO EnginePowerLimited		
					Not in Device Control for:	Wastegate Control Bypass Control		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Random Misfire Detected	P0300	These DTC's will determine if a random or a cylinder specific misfire is occurring by monitoring crankshaft velocity	Deceleration index vs. Engine Speed Vs Engine load Deceleration index calculation is tailored to specific veh. Tables used are 1st tables encountered that are not max of range. Undetectable region at a given speed/load point is where all tables are max of range point. see Algorithm Description Document for additional details.	**(>**Idle SCD AND > Idle SCD ddt Tables) **OR** (>SCD Delta AND > SCD Delta ddt Tables) **OR** (>Idle Cyl Mode AND > Idle Cyl Mode ddt Tables) **OR** (>Cyl Mode AND > Cyl Mode ddt Tables) **OR** (>Rev Mode Table) **OR** (> AFM Table in Cyl Deact mode)	Engine Run Time ECT If ECT at startup ECT System Voltage + Throttle delta - Throttle delta	> 2 crankshaft revolutions -7ºC < ECT < 130ºC < -7ºC 21ºC < ECT < 130ºC 9.00<volts<32.00 < 95.00% per 25 ms < 95.00% per 25 ms	Emission Exceedence = any (5) failed 200 rev blocks out of (16) 200 rev block tests Failure reported for (1) Exceedence in 1st (16) 200 rev block tests, or (4) Exceedences thereafter. any Catalyst Exceedence = (1) 200 rev block as data supports for catalyst damage. Failure reported with (1 or 3) Exceedences in FTP, or (1) Exceedence outside FTP.	2 Trips Type B (Mil Flashes with Catalyst Damaging Misfire)
Cylinder 1 Misfire Detected	P0301							
Cylinder 2 Misfire Detected	P0302							
Cylinder 3 Misfire Detected	P0303							
Cylinder 4 Misfire Detected	P0304							
Cylinder 5 Misfire Detected	P0305							
Cylinder 6 Misfire Detected	P0306							
Cylinder 7 Misfire Detected	P0307							
Cylinder 8 Misfire Detected	P0308		Misfire Percent Emission Failure Threshold	≥ 0.70% P0300 ≥ 0.70% emission				
			Misfire Percent Catalyst Damage	>"Catalyst Damaging Misfire Percentage" Table whenever secondary conditions are met.	Engine Speed Engine Load Misfire counts (at low speed/loads, one cylinder may not cause cat damage)	> 1400 rpm AND > 20 % load AND < 180 counts on one cylinder		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			When engine speed and load are less than the FTP cals (3) catalyst damage exceedences are allowed.	≤ 0 FTP rpm AND ≤ 0 FTP % load			Continuous	
					Engine Speed	650 < rpm < (Engine Speed Limit) - 400 Engine speed limit is a function of inputs like Gear and temperature typical Engine Speed Limit = 6200 rpm	4 cycle delay	
				disable conditions:	No active DTCs:	TPS_FA EnginePowerLimited MAF_SensorTFTKO MAP_SensorTFTKO IAT_SensorTFTKO ECT_Sensor_Ckt_TFTKO 5VoltReferenceB_FA CrankSensorTestFailedTKO CrankSensorFaultActive CrankIntakeCamCorrelationFA CrankExhaustCamCorrelationFA CrankCamCorrelationTFTKO AnyCamPhaser_FA AnyCamPhaser_TFTKO If Monitor Rough Road=1 and RoughRoadSource="TOSS" Transmission Output Shaft Angular Velocity Validity (Auto Trans only) Clutch Sensor FA (Manual Trans only)	4 cycle delay	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						TransEngagedState_FA (Auto Trans only)		
					P0315 & engine speed	> 1000 rpm		
					Fuel Level Low		500 cycle delay	
						LowFuelConditionDiagnostic		
					Cam and Crank Sensors	in sync with each other	4 cycle delay	
					Misfire requests TCC unlock	Not honored because Transmission in hot mode or Post O2 intrusive diagnostic running	4 cycle delay	
							4 cycle delay	
					Fuel System Status	≠ Fuel Cut		
					Active Fuel Management	Transition in progress	0 cycle delay	
					Undetectable engine speed and engine load region	invalid speed load range in **decel index** tables	4 cycle delay	
					Abusive Engine Over Speed	> 6800 rpm	1250 cycle delay	
					Below zero torque (except CARB approved 3000 rpm to redline triangle.)	<" Zero torque engine load" in Supporting Tables tab	4 cycle delay	
					Below zero torque:		4 cycle delay	
					TPS	≤ 1%		
					Veh Speed	> 30 mph		
					EGR Intrusive test	Active	0 cycle delay	
					Manual Trans	Clutch shift	4 cycle delay	
					Throttle Position AND Automatic transmission shift	> 98.00%	7 cycle delay	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Driveline Ring Filter active After a low level misfire, another misfire may not be detectable until driveline ringing ceases. If no ringing seen, stop filter early. Filter Driveline ring: Stop filter early:	 4 engine cycles after misfire 3 Engine cycles after misfire		
					Abnormal engine speed oscillations: (Rough road etc) Off Idle, number of consecutive decelerating cylinders after accelerating,: (Number of decels can vary with misfire detection equation) TPS Engine Speed Veh Speed SCD Cyl Mode Rev Mode	 > 3 % > 950 rpm > 3 mph = 4 consecutive cyls = 4 consecutive cyls = 4 consecutive cyls		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Misfire Pattern Recognition Enabled: Validates misfire vs. false detection	1 (1 = Enabled)		
					Engine Speed	Between > 700 RPM and < 3000 RPM		
					Veh Speed	> 1 kph		
					Final fail conditions within:	> 0.8 < 2.0 of misfire threshold for a given engine speed and load		
					Rough Road Section: Monitor Rough Road	0 (1=Yes)		
					RoughRoadSource	WheelSpeedInECM		
					IF Rough Road is monitored, then ONE of the following Rough Road Sources will be used:			
					Rough Road Source = "TOSS"			
					Rough Road	detected		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Rough Road Source = "WheelSpeedInECM" ABS/TCS system RoughRoad VSES Rough Road Source = "FromABS" ABS/TCS system RoughRoad VSES	 active detected active active detected active		
Crankshaft Position System Variation Not Learned	P0315	Monitor for valid crankshaft error compensation factors	Sum of Compensation factors	≥ 2.0040 OR ≤ 1.9960	OBD Manufacturer Enable Counter	=0	0.50 seconds Frequency Continuous 100 msec	1 Trips Type A
Knock Sensor (KS) Performance Per Cylinder	P0324	This diagnostic checks for knock sensor performance out of the normal expected range due to: 1) Excessive knock **and** 2) Abnormal engine noise on a per cylinder basis	Common Enable Criteria		Diagnostic Enabled? Engine Speed Engine Air Flow ECT IAT	Disabled ≤ 8500 RPM ≥ 0 mg/cylinder and ≤ 2000 mg/cylinder ≥ -40 deg's C ≥ -40 deg's C	First Order Lag Filter with Weight Coefficient	Type: B MIL: YES Trips: 2
			Specific Enable Criteria and Thresholds					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			1. Filtered Knock Intensity (for Excessive Knock) VaKNKD_k_PerfCylKnockIntFilt	> 1.5000	Engine Speed Engine running	≥ 400 RPM ≥ 7.5 seconds	Weight Coefficient = 0.0300 Updated each engine event	
			2. Filtered FFT Intensity: (for Abnormal Noise) VaKNKD_k_PerfCylAbnFiltIntnsity	< Abnormal Noise Threshold (see supporting tables)	Engine Speed Engine running	≥ 2000 RPM ≥ 1.5 seconds	Weight Coefficient = 0.0025 Updated each engine event	
Knock Sensor (KS) Circuit Bank 1	P0325	This diagnostic checks for an open in the knock sensor circuit	Filtered FFT Output (VaKNKD_k_OpenFiltIntensity[0])	> OpenCktThrshMin **and** < OpenCktThrshMax See Supporting Tables for OpenCktThrshMin & Max	Diagnostic Enabled?	Enabled	First Order Lag Filter with Weight Coefficient	Type: B MIL: YES Trips: 2
					Engine Speed	≥ 400 RPM and ≤ 8500 RPM		
					Engine Air Flow	≥ 20 mg/cylinder and ≤ 2000 mg/cylinder		
							Weight Coefficient = 0.0100 Updated each engine event	
					ECT	≥ -40 deg's C		
					IAT	≥ -40 deg's C		
					Engine running	≥ 7.5 seconds		
Knock Sensor (KS) Performance Bank 1	P0326	This diagnostic checks for knock sensor performance out of the normal expected range due to 1. Excessive knock **or** 2. Abnormal engine noise on a per bank/sensor basis	Common Enable Criteria		Diagnostic Enabled?	Enabled	First Order Lag Filter with Weight Coefficient	Type: B MIL: YES Trips: 2
					Engine Speed	≤ 8500 RPM		
					Engine Air Flow	≥ 0 mg/cylinder and ≤ 2000 mg/cylinder		
					ECT	≥ -40 deg's C		
					IAT	≥ -40 deg's C		
			1. Filtered Knock Intensity (for Excessive Knock) VaKNKD_k_PerfKnockIntFilt	> 1.5000	Engine Speed Engine running	≥ 400 RPM ≥ 7.5 seconds	Weight Coefficient = 0.0150	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
							Updated each engine event	
			2. Filtered FFT Intensity: (for Abnormal Noise) VaKNKD_k_PerfAbnFiltIntnsity	< Abnormal Noise Threshold (see supporting tables)	Engine Speed Engine running	≥ 2000 RPM ≥ 6.0 seconds	Weight Coefficient = 0.0100 Updated each	
Knock Sensor (KS) Circuit Low Bank 1	P0327	This diagnostic checks for an out of range low knock sensor signal	Sensor Input Signal Line	< 0.57 Volts	Diagnostic Enabled?	Enabled	50 Failures out of 63 Samples	Type: B MIL: YES Trips: 2
					Engine Speed	> 400 RPM and < 8500 RPM	100 msec rate	
			or					
			Sensor Return Signal Line	< 0.40 Volts				
Knock Sensor (KS) Circuit High Bank 1	P0328	This diagnostic checks for an out of range high knock sensor signal	Sensor Input Signal Line	> 2.76 Volts	Diagnostic Enabled?	Enabled	50 Failures out of 63 Samples	Type: B MIL: YES Trips: 2
					Engine Speed	> 400 RPM and < 8500 RPM	100 msec rate	
			or					
			Sensor Return Signal Line	> 1.95 Volts				
Knock Sensor (KS) Circuit Bank 2	P0330	This diagnostic checks for an open in the knock sensor circuit	Filtered FFT Output (VaKNKD_k_OpenFiltIntensity[1])	> OpenCktThrshMin **and** < OpenCktThrshMax See Supporting Tables for OpenCktThrshMin & Max	Diagnostic Enabled?	Enabled	First Order Lag Filter with Weight Coefficient	Type: B MIL: YES Trips: 2
					Engine Speed	≥ 400 RPM and ≤ 8500 RPM		
					Engine Air Flow	≥ 20 mg/cylinder and ≤ 2000 mg/cylinder		
					ECT	≥ -40 deg's C	Weight Coefficient = 0.0100	
					IAT	≥ -40 deg's C		
					Engine running	≥ 7.5 seconds		
							Updated each engine event	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Knock Sensor (KS) Performance Bank 2	P0331	This diagnostic checks for knock sensor performance out of the normal expected range due to 1. Excessive knock **or** 2. Abnormal engine noise on a per bank basis			Diagnostic Enabled?	Enabled	First Order Lag Filter with Weight Coefficient	Type: B MIL: YES Trips: 2
					Engine Speed	≤ 8500 RPM		
					Engine Air Flow	≥ 0 mg/cylinder and ≤ 2000 mg/cylinder		
					ECT	≥ -40 deg's C		
					IAT	≥ -40 deg's C		
			1. Filtered Knock Intensity (for Excessive Knock) VaKNKD_k_PerfKnockIntFilt	> 1.5000	Engine Speed Engine running	≥ 400 RPM ≥ 7.5 seconds	Weight Coefficient = 0.0150 Updated each engine event	
			2. Filtered FFT Intensity: (for Abnormal Noise) VaKNKD_k_PerfAbnFiltIntnsity	< Abnormal Noise Threshold (see supporting tables)	Engine Speed Engine running	≥ 2000 RPM ≥ 6.0 seconds	Weight Coefficient = 0.0100 Updated each engine event	
Knock Sensor (KS) Circuit Low Bank 2	P0332	This diagnostic checks for an out of range low knock sensor signal	Sensor Input Signal Line	< 0.57 Volts	Diagnostic Enabled?	Enabled	50 Failures out of 63 Samples	Type: B MIL: YES Trips: 2
					Engine Speed	> 400 RPM and < 8500 RPM	100 msec rate	
			or					
			Sensor Return Signal Line	< 0.40 Volts				
Knock Sensor (KS) Circuit High Bank 2	P0333	This diagnostic checks for an out of range high knock sensor signal	Sensor Input Signal Line	> 2.76 Volts	Diagnostic Enabled?	Enabled	50 Failures out of 63 Samples	Type: B MIL: YES Trips: 2
					Engine Speed	> 400 RPM and < 8500 RPM	100 msec rate	
			or					
			Sensor Return Signal Line	> 1.95 Volts				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Crankshaft Position (CKP) Sensor A Circuit	P0335	Determines if a fault exists with the crank position sensor signal	Engine-Cranking Crankshaft Test: Time since last crankshaft position sensor pulse received	>= 4.0 seconds	Engine-Cranking Crankshaft Test: Starter engaged AND (cam pulses being received OR (DTC P0101 AND DTC P0102 AND DTC P0103 AND Engine Air Flow	= FALSE = FALSE = FALSE > 3.0 grams/second))	Engine-Cranking Crankshaft Test: Continuous every 100 msec	Type B 2 trips
			Time-Based Crankshaft Test: No crankshaft pulses received	>= 1.0 seconds	Time-Based Crankshaft Test: Engine is Running Starter is not engaged No DTC Active:	5VoltReferenceB_FA	Time-Based Crankshaft Test: Continuous every 12.5 msec	
			Event-Based Crankshaft Test: No crankshaft pulses received		Event-Based Crankshaft Test: Engine is Running OR Starter is engaged No DTC Active:	5VoltReferenceA_FA 5VoltReferenceB_FA P0365 P0366	Event-Based Crankshaft Test: 2 failures out of 10 samples One sample per engine revolution	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Crankshaft Position (CKP) Sensor A Performance	P0336	Determines if a performance fault exists with the crank position sensor signal	Crank Re-synchronization Test: Time in which 10 or more crank re-synchronizations occur	< 10.0 seconds	Crank Re-synchronization Test: Engine Air Flow Cam-based engine speed No DTC Active:	>= 3.0 grams/second > 450 RPM 5VoltReferenceB_FA P0335	Crank Re-synchronization Test: Continuous every 250 msec	Type B 2 trips
			Time-Based Crankshaft Test: No crankshaft synchronization gap found	>= 0.4 seconds	Time-Based Crankshaft Test: Engine is Running Starter is not engaged No DTC Active:	 5VoltReferenceB_FA	Time-Based Crankshaft Test: Continuous every 12.5 msec	
			Engine Start Test during Crank: Time since starter engaged without detecting crankshaft synchronization gap	>= 1.5 seconds	Engine Start Test during Crank: Starter engaged AND (cam pulses being received OR (DTC P0101 AND DTC P0102 AND DTC P0103 AND Engine Air Flow	 = FALSE = FALSE = FALSE > 3.0 grams/second))	Engine Start Test during Crank: Continuous every 100 msec	
			Event-Based Crankshaft Test: Crank Pulses received in one engine revolution OR	< 51	Event-Based Crankshaft Test: Engine is Running OR Starter is engaged	 	Event-Based Crankshaft Test: 8 failures out of 10 samples	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Crank Pulses received in one engine revolution	> 65	No DTC Active:	5VoltReferenceA_FA 5VoltReferenceB_FA P0365 P0366	One sample per engine revolution	
Camshaft Position (CMP) Sensor Circuit Bank 1 Sensor A	P0340	Determines if a fault exists with the cam position bank 1 sensor A signal	<u>Engine Cranking Camshaft Test:</u> Time since last camshaft position sensor pulse received OR Time that starter has been engaged without a camshaft sensor pulse <u>Time-Based Camshaft Test:</u> Fewer than 4 camshaft pulses received in a time <u>Fast Event-Based Camshaft Test:</u> No camshaft pulses received during first 12 MEDRES events (There are 12 MEDRES events per engine cycle)	 >= 5.5 seconds >= 4.0 seconds > 3.0 seconds	<u>Engine Cranking Camshaft Test:</u> Starter engaged AND (cam pulses being received OR (DTC P0101 AND DTC P0102 AND DTC P0103 AND Engine Air Flow <u>Time-Based Camshaft Test:</u> Engine is Running Starter is not engaged No DTC Active: <u>Fast Event-Based Camshaft Test:</u> Crankshaft is synchronized Starter must be engaged to enable the diagnostic, but the diagnostic will not disable when the	 = FALSE = FALSE = FALSE > 3.0 grams/second)) 5VoltReferenceA_FA	<u>Engine Cranking Camshaft Test:</u> Continuous every 100 msec <u>Time-Based Camshaft Test:</u> Continuous every 100 msec <u>Fast Event-Based Camshaft Test:</u> Continuous every MEDRES event	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					starter is disengaged			
					No DTC Active:	5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA		
			Slow Event-Based Camshaft Test: The number of camshaft pulses received during 100 engine cycles	= 0	Slow Event-Based Camshaft Test: Crankshaft is synchronized No DTC Active:	5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA	Slow Event-Based Camshaft Test: 8 failures out of 10 samples Continuous every engine cycle	
Camshaft Position (CMP) Sensor Performance Bank 1 Sensor A	P0341	Determines if a performance fault exists with the cam position bank 1 sensor A signal	Fast Event-Based Camshaft Test: The number of camshaft pulses received during first 12 MEDRES events is less than 4 or greater than 10 (There are 12 MEDRES events per engine cycle)		Fast Event-Based Camshaft Test: Crankshaft is synchronized Starter must be engaged to enable the diagnostic, but the diagnostic will not disable when the starter is disengaged		Fast Event-Based Camshaft Test: Continuous every MEDRES event	Type B 2 trips
					No DTC Active:	5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA		
			Slow Event-Based Camshaft Test:		Slow Event-Based Camshaft Test:		Slow Event-Based Camshaft Test:	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			The number of camshaft pulses received during 100 engine cycles OR	 < 398 > 402	Crankshaft is synchronized No DTC Active:	 5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA	8 failures out of 10 samples Continuous every engine cycle	
IGNITION CONTROL #1 CIRCUIT	P0351	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 1	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running Ignition Voltage	 > 6.00 Volts	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
IGNITION CONTROL #2 CIRCUIT	P0352	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 2	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running Ignition Voltage	 > 6.00 Volts	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
IGNITION CONTROL #3 CIRCUIT	P0353	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 3	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running Ignition Voltage	 **> 6.00 Volts**	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
IGNITION CONTROL #4 CIRCUIT	P0354	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 4	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running Ignition Voltage	 **> 6.00 Volts**	50 Failures out of 63Samples 100 msec rate	Type: B MIL: YES Trips: 2

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Camshaft Position (CMP) Sensor Circuit Bank 1 Sensor B	P0365	Determines if a fault exists with the cam position bank 1 sensor B signal	Engine Cranking Camshaft Test: Time since last camshaft position sensor pulse received OR Time that starter has been engaged without a camshaft sensor pulse Time-Based Camshaft Test: Fewer than 4 camshaft pulses received in a time Fast Event-Based Camshaft Test: No camshaft pulses received during first 12 MEDRES events (There are 12 MEDRES events per engine cycle)	 >= 5.5 seconds >= 4.0 seconds > 3.0 seconds	Engine Cranking Camshaft Test: Starter engaged AND (cam pulses being received OR (DTC P0101 AND DTC P0102 AND DTC P0103 AND Engine Air Flow Time-Based Camshaft Test: Engine is Running Starter is not engaged No DTC Active: Fast Event-Based Camshaft Test: Crankshaft is synchronized Starter must be engaged to enable the diagnostic, but the diagnostic will not disable when the starter is disengaged No DTC Active:	 = FALSE = FALSE = FALSE > 3.0 grams/second)) 5VoltReferenceA_FA 5VoltReferenceA_FA	Engine Cranking Camshaft Test: Continuous every 100 msec Time-Based Camshaft Test: Continuous every 100 msec Fast Event-Based Camshaft Test: Continuous every MEDRES event	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						5VoltReferenceB_FA CrankSensor_FA		
			Slow Event-Based Camshaft Test: The number of camshaft pulses received during 100 engine cycles	= 0	Slow Event-Based Camshaft Test: Crankshaft is synchronized No DTC Active:	5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA	Slow Event-Based Camshaft Test: 8 failures out of 10 samples Continuous every engine cycle	
Camshaft Position (CMP) Sensor Performance Bank 1 Sensor B	P0366	Determines if a performance fault exists with the cam position bank 1 sensor B signal	Fast Event-Based Camshaft Test: The number of camshaft pulses received during first 12 MEDRES events is less than 4 or greater than 10 (There are 12 MEDRES events per engine cycle)		Fast Event-Based Camshaft Test: Crankshaft is synchronized Starter must be engaged to enable the diagnostic, but the diagnostic will not disable when the starter is disengaged No DTC Active:	5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA	Fast Event-Based Camshaft Test: Continuous every MEDRES event	Type B 2 trips
			Slow Event-Based Camshaft Test: The number of camshaft pulses received during 100 engine cycles OR	< 398 > 402	Slow Event-Based Camshaft Test: Crankshaft is synchronized No DTC Active:	5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA	Slow Event-Based Camshaft Test: 8 failures out of 10 samples Continuous every engine cycle	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Catalyst System Low Efficiency Bank 1	P0420	Oxygen Storage	Normalized Ratio OSC Value (EWMA filtered)	< 0.350	***Valid Idle Period Criteria***		1 test attempted per valid idle period Minimum of 1 test per trip Maximum of 8 tests per trip Frequency: Fueling Related : 12.5 ms OSC Measurements: 100 ms Temp Prediction: 1000ms	Type A 1 Trip(s)
		The catalyst washcoat contains Cerium Oxide. Cerium Oxide reacts with NO and O2 during lean A/F excursions to store the excess oxygen (I.e. Cerium Oxidation). During rich A/F excursions, Cerium Oxide reacts with CO and H2 to release this stored oxygen (I.e. Cerium Reduction). This is referred to as the Oxygen Storage Capacity, or OSC. CatMon's strategy is to "measure" the OSC of the catalyst through forced Lean and Rich A/F excursions Normalized Ratio OSC Value Calculation Information and Definitions = 1. Raw OSC Calculation = (post cat O2 Resp time - pre cat O2 Resp time) 2. BestFailing OSC value from a calibration table (based on temp and exhaust gas flow) 3. WorstPassing OSC value (based on temp and exhaust gas flow) Normalized Ratio Calculation = (1-2) / (3-2) A Normalized Ratio of 1 essentially represents a good part and a ratio of 0 essentially represents a very bad part.			Driver must be off the accel pedal. This checks that the final accel pedal position (comprehending deadband and hysteresis) is essentially zero.			
					Vehicle Speed	*< 1.24 MPH*		
					Engine speed	> 1125 RPM for a minimum of 20 seconds since end of last idle period.		
					Engine run time	≥ MinimumEngineRunTime**, This is a function of Coolant Temperature, please see Supporting Tables**		
					Tests attempted this trip	< 255		
					The catalyst diagnostic has not yet completed for the current trip.			
					Catalyst Idle Conditions Met Criteria			
					General Enable met and the Valid Idle Period Criteria met			
					Green Converter Delay	Not Active		
					Induction Air	*-20 < ° C < 250*		
					Intrusive test(s): Fueltrim Post O2 EVAP EGR	Not Active		
		The Catalyst Monitoring Test is done during idle. Several conditions must be meet in order to execute this test. These conditions and their related values are listed in the secondary parameters area of this document.			Other vehicle functions: Power Take Off	Not Active		
					RunCrank Voltage	> 10.90 Volts		
					Ethanol Estimation	NOT in Progress		
					ECT	*40 < ° C < 140*		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Barometric Pressure	> 70 KPA		
					Idle Time before going intrusive is	< 50 Seconds		
					Idle time is incremented if Vehicle speed	< 1.24 MPH and the drivers foot is off accel pedal and the idle speed control system is active as identified in the Valid Idle Period Criteria section.		
					Short Term Fuel Trim	*0.80 < ST FT < 1.20*		
					Predicted catalyst temp > 400 degC AND Engine Airflow > MinAirflowToWarmCatalyst table (g/s) (refer to "Supporting Tables" tab) (Based on engine coolant at the time the WarmedUpEvents counter resets to 0.) for at least 40 seconds with a closed throttle time < 60 seconds consecutively (closed throttle consideration involves having the driver off the accel pedal as stated in the Valid Idle Period Criteria Section) . Also, in order to increment the WarmedUpEvents counter (counter must exceed 40 cal value), either the vehicle speed must exceed the vehicle speed cal or the driver must NOT be off the accel pedal as stated in the Valid Idle Period Criteria section above.			
					Closed loop fueling Enabled **Please see "Closed Loop Enable Criteria" section of the "Supporting Tables" tab for details.**			
					PRNDL is in Drive Range on an Auto Transmission vehicle.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Idle Stable Criteria :: Must hold true from after Catalyst Idle Conditions Met to the end of test			
					MAF	*2.00 < g/s < 12.00*		
					Predicted catalyst temperature	< 750 degC		
					Engine Fueling Criteria at Beginning of Idle Period			
					The following fueling related must also be met from between 4 and 7 seconds after the Catalyst Idle Conditions Met Criteria has been met for at least 4 seconds prior to allowing intrusive control			
					Number of pre-O2 switches	>= 2		
					Short Term Fuel Trim Avg	*0.850 < ST FT Avg < 1.100*		
					Rapid Step Response (RSR) feature will initiate multiple tests:			
					If the difference between current EWMA value and the current OSC Normalized Ratio value is > 0.530 and the current OSC Normalized Ratio value is < 0.100			
					Maximum of 23 RSR tests to detect failure when RSR is enabled.			
					Green Converter Delay Criteria			
					This is part of the check for the Catalyst Idle Conditions Met Criteria section			
					The diagnostic will not be enabled until the following has been met:			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Predicted catalyst temperature > 0 ° C for 0 seconds non-continuously. Note: this feature is only enabled when the vehicle is new and cannot be enabled in service			
					PTO Not Active			
					General Enable			
					DTC's Not Set			
					MAF_SensorFA			
					MAF_SensorTFTKO			
					AmbPresDfltdStatus			
					IAT_SensorCircuitFA			
					IAT_SensorCircuitTFTKO			
					ECT_Sensor_FA			
					O2S_Bank_1_Sensor_1_FA			
					O2S_Bank_1_Sensor_2_FA			
					O2S_Bank_2_Sensor_1_FA			
					O2S_Bank_2_Sensor_2_FA			
					FuelTrimSystemB1_FA			
					FuelTrimSystemB1_TFTKO			
					FuelTrimSystemB2_FA			
					FuelTrimSystemB2_TFTKO			
					EngineMisfireDetected_FA			
					EvapPurgeSolenoidCircuit_FA			
					IAC_SystemRPM_FA			
					EGRValvePerformance_FA			
					EGRValveCircuit_FA			
					CamSensorAnyLocationFA			
					CrankSensor_FA			
					TPS_Performance_FA			
					EnginePowerLimited			
					VehicleSpeedSensor_FA			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Evaporative Emission (EVAP) System Small Leak Detected	P0442	This DTC will detect a small leak (≥ 0.020") in the EVAP system between the fuel fill cap and the purge solenoid. The engine off natural vacuum method (EONV) is used. EONV is an evaporative system leak detection diagnostic that runs when the vehicle is shut off when enable conditions are met. Prior to sealing the system and performing the diagnostic, the fuel volatility is analyzed. In an open system (Canister Vent Solenoid [CVS] open) high volatility fuel creates enough flow to generate a measurable pressure differential relative to atmospheric.	The total delta from peak pressure to peak vacuum during the test is normalized against a calibration pressure threshold table that is based upon fuel level and ambient temperature. (See P0442: EONV Pressure Threshold Table on Supporting Tables Tab). The normalized value is calculated by the following equation: 1 - (peak pressure - peak vacuum) / pressure threshold. The normalized value is entered into EWMA (with 0= perfect pass and 1= perfect fail).		Fuel Level Drive Time Drive length ECT Baro Odometer Engine not run time before key off must be Time since last complete test if normalized result and EWMA is passing OR Time since last complete test if normalized result or EWMA is failing Estimated ambient temperature at end of drive Estimate of Ambient Air Temperature Valid	10 % ≤ Percent ≤ 90 % ≥ 600 seconds ≥ 3.1 miles ≥ 70 °C ≥ 70 kPa ≥ 10.0 miles ≤ refer to "P0442: Engine Off Time Before Vehicle Off Maximum as a Function of Estimated Ambient Temperature table" in Supporting Tables. ≥ 17 hours ≥ 10 hours 0 °C ≤ Temperature ≤ 34 °C	Once per trip, during hot soak (up to 2400 sec.). No more than 2 unsuccessful attempts between completed tests.	1 trip Type A EWMA Average run length is 6 under normal conditions Run length is 3 to 6 trips after code clear or non-volatile reset
			When EWMA is , the DTC light is illuminated.	> 0.63 (EWMA Fail Threshold)	**Conditions for Estimate of Ambient Air Temperature to be valid:**			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		After the volatility check, the vent solenoid will close. After the vent is closed, typically a build up of pressure from the hot soak begins (phase-1). The pressure typically will peak and then begin to decrease as the fuel cools. When the pressure drops (-62.27) Pa from peak pressure, the vent is then opened for 60 seconds to normalize the system pressure. The vent is again closed to begin the vacuum portion of the test (phase-2). As the fuel temperature continues to fall, a vacuum will begin forming. The vacuum will continue until it reaches a vacuum peak. When the pressure rises 62.27 Pa from vacuum peak, the test then completes. If the key is turned on while the diagnostic test is in progress, the test will abort.	The DTC light can be turned off if the EWMA is and stays below the EWMA fail threshold for 2 additional consecutive trips.	≤ 0.35 (EWMA Re-Pass Threshold)	**1. Cold Start** Startup delta deg C (ECT-IAT) OR **2. Short Soak and Previous EAT Valid** Previous time since engine off OR **3. Less than a short soak and Previous EAT Not Valid** Previous time since engine off AND Must expire Estimate of Ambient Temperature Valid Conditioning Time. **"P0442: Estimate of Ambient Temperature Valid Conditioning Time" in Supporting Tables Tab.** OR **4. Not a Cold Start and greater than a Short Soak**	≤ 8 °C ≤ 7200 seconds ≤ 7200 seconds Vehicle Speed ≥ 14.3 mph AND Mass Air Flow ≥ 8 g/sec		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Previous time since engine off AND Must expire maximum value in Estimate of Ambient Temperature Valid Conditioning Time. **Please see "P0442: Estimate of Ambient Temperature Valid Conditioning Time" in Supporting Tables Tab.**	> 7200 seconds Vehicle Speed ≥ 14.3 mph AND Mass Air Flow ≥ 8 g/sec		
				Abort Conditions:	**1. High Fuel Volatility** During the volatility phase, pressure in the fuel tank is integrated vs. time. If the integrated pressure is then test aborts and unsuccessful attempts is incremented. OR **2. Vacuum Refueling Detected**	 < -5		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					See P0454 Fault Code for information on vacuum refueling algorithm. OR **3. Fuel Level Refueling Detected** See P0464 Fault Code for information on fuel level refueling. OR **4. Vacuum Out of Range and No Refueling** See P0451 Fault Code for information on vacuum sensor out of range and P0464 Fault Code for information on fuel level refueling. OR **5. Vacuum Out of Range and Refueling Detected** See P0451 Fault Code for information on vacuum sensor out			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					of range and P0464 Fault Code for information on fuel level refueling. OR **6. Vent Valve Override Failed** Device control using an off-board tool to control the vent solenoid, cannot exceed during the EONV test OR **7. Key up during EONV test** No active DTCs:	0.50 seconds FuelLevelDataFault MAF_SensorFA ECT_Sensor_FA IAT_SensorFA VehicleSpeedSensor_FA IgnitionOffTimeValid AmbientAirDefault P0443 P0446 P0449 P0452 P0453 P0455 P0496		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Evaporative Emission (EVAP) Canister Purge Solenoid Valve Circuit (ODM)	P0443	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		PT Relay Voltage	11 volts ≤ Voltage ≤ 32 volts	20 failures out of 25 samples 250 ms / sample Continuous with solenoid operation	2 trips Type B
Evaporative Emission (EVAP) Vent System Performance	P0446	This DTC will determine if a restriction is present in the vent solenoid, vent filler, vent hose or EVAP canister. This test runs with normal purge and vent valve is open.	Vent Restriction Prep Test: Vented Vacuum OR Vented Vacuum for 60 seconds Vent Restriction Test: Tank Vacuum for 5 seconds BEFORE Purge Volume After setting the DTC for the first time, 2 liters of fuel must be consumed before setting the DTC for the second time.	 < -623 Pa > 1245 Pa > 2989 Pa ≥ 10 liters	Fuel Level System Voltage Startup IAT Startup ECT BARO No active DTCs:	10% ≤ Percent ≤ 90% 11 volts ≤ Voltage ≤ 32 volts 4 °C ≤ Temperature ≤ 30 °C ≤ 35 °C ≥ 70 kPa MAP_SensorFA TPS_FA VehicleSpeedSensor_FA IAT_SensorCircuitFA ECT_Sensor_FA AmbientAirDefault EnginePowerLimited P0443 P0449 P0452 P0453 P0454	Once per Cold Start Time is dependent on driving conditions Maximum time before test abort is 1000 seconds	2 trips Type B
Evaporative Emission (EVAP) Vent Solenoid Control Circuit (ODM)	P0449	This DTC checks the circuit for electrical integrity during operation. If the P0449 is active, an intrusive test is performed with the	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Run/Crank Voltage Run/Crank voltage goes to 0 volts at key off	11 volts ≤ Voltage ≤ 32 volts	20 failures out of 25 samples 250 ms / sample	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		vent solenoid commanded closed for 15 seconds.					Continuous with solenoid operation	
Fuel Tank Pressure (FTP) Sensor Circuit Performance	P0451	The DTC will be set if the fuel tank vacuum sensor is out of range when it tries to re-zero prior to the phase-1 or phase-2 portions of the engine-off natural vacuum small leak test.	The tank vacuum sensor voltage is compared to a window about the nominal sensor voltage offset (~1.5 volts) Upper voltage threshold (voltage addition above the nominal voltage) Lower voltage threshold (voltage subtraction below the nominal voltage) The difference between tank vacuum sensor voltage and the nominal offset voltage is then normalized against the appropriate threshold listed above to produce a ratio between 0.0 and 1.0. This normalized re-zero ratio is then filtered with a EWMA (with 0= perfect pass and 1=perfect fail).	0.2 volts 0.2 volts	This test will execute whenever the engine-off natural vacuum small leak test (P0442) executes		This test is executed during an engine-off natural vacuum small leak test. The number of times that it executes can range from zero to two per engine-off period. The length of the test is determined by the refueling rationality test, which can take up to 600 seconds to complete.	1 trip Type A EWMA Average run length: 6 Run length is 2 trips after code clear or non-volatile reset

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			When EWMA is , the DTC light is illuminated. The DTC light can be turned off if the EWMA is and stays below the EWMA fail threshold for 2 additional consecutive trips.	> 0.73 (EWMA Fail Threshold) ≤ 0.40 (EWMA Re-Pass Threshold)				
Fuel Tank Pressure (FTP) Sensor Circuit Low Voltage	P0452	This DTC will detect a fuel tank pressure sensor signal that is too low out of range.	Fuel tank pressure sensor signal The normal operating range of the fuel tank pressure sensor is 0.5 volts (~1245 Pa) to 4.5 volts (~ -3736 Pa).	< 0.15 volts (3 % of Vref or ~ 1681 Pa)	Time delay after sensor power up for sensor warm-up ECM State ≠ crank Stops 6.0 seconds after key-off	is 0.10 seconds	80 failures out of 100 samples 100 ms / sample Continuous	2 trips Type B
Fuel Tank Pressure (FTP) Sensor Circuit High Voltage	P0453	This DTC will detect a fuel tank pressure sensor signal that is too high out of range.	Fuel tank pressure sensor signal The normal operating range of the fuel tank pressure sensor is 0.5 volts (~1245 Pa) to 4.5 volts (~ -3736 Pa).	> 4.85 volts (97% of Vref or ~ -4172 Pa)	Time delay after sensor power up for sensor warm-up ECM State ≠ crank Stops 6.0 seconds after key-off	is 0.10 seconds	80 failures out of 100 samples 100 ms / sample Continuous	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Fuel Tank Pressure (FTP) Sensor Circuit Intermittent	P0454	This DTC will detect intermittent tank vacuum sensor signals that would have caused the engine-off natural vacuum small leak test to abort due to an apparent re-fueling event.	If an abrupt change in tank vacuum is detected the engine-off natural vacuum test is aborted due to an apparent refueling event. Subsequent to the abort, a refueling rationality test is executed to confirm that a refueling event occurred. If a refueling is confirmed, then the test sample is considered passing. Otherwise, the sample is considered failing indicating an intermittent signal problem.		This test will execute whenever the engine-off natural vacuum small leak test (P0442) executes		This test is executed during an engine-off natural vacuum small leak test. The test can only execute up to once per engine-off period. The length of the test is determined by the refueling rationality test, which can take up to 600 seconds to complete. The test will report a failure if 2 out of 3 samples are failures.	1 trips Type A
			An abrupt change is defined as a change in vacuum:					
			in the span of 1.0 seconds.	>112 Pa				
			But in 12.5 msec.	< 249 Pa			12.5 ms / sample	
			A refueling event is confirmed if the fuel level has a persistent change for 30 seconds.	of 10 %			Continuous when vent solenoid is closed.	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Evaporative Emission (EVAP) System Large Leak Detected	P0455	This DTC will detect a weak vacuum condition (large leak or purge blockage) in the EVAP system. Purge valve is controlled (to allow purge flow) and vent valve is commanded closed.	Purge volume while Tank vacuum After setting the DTC for the first time, 2 liters of fuel must be consumed before setting the DTC for the second time. <u>Weak Vacuum Follow-up Test</u> (fuel cap replacement test) Weak Vacuum Test failed. Passes if tank vacuum Note: Weak Vacuum Follow-up Test can only report a pass.	> 30 liters ≤ 1993 Pa ≥ 2740 Pa	Fuel Level System Voltage BARO Purge Flow No active DTCs: <u>Cold Start Test</u> If ECT > IAT, Startup temperature delta (ECT-IAT): Cold Test Timer Startup IAT Startup ECT <u>Weak Vacuum Follow-up Test</u> This test can run following a weak vacuum failure or on a hot restart.	10% ≤ Percent ≤ 90% 11 volts ≤ Voltage ≤ 32 volts ≥ 70 kPa ≥ 2.50 % MAP_SensorFA TPS_FA VehicleSpeedSensor_FA IAT_SensorCircuitFA ECT_Sensor_FA AmbientAirDefault EnginePowerLimited P0443 P0449 P0452 P0453 P0454 ≤ 8 °C ≤ 1000 seconds 4 °C ≤ Temperature ≤ 30 °C ≤ 35 °C	Once per cold start Time is dependent on driving conditions Maximum time before test abort is 1000 seconds <u>Weak Vacuum Follow-up Test</u> With large leak detected, the follow-up test is limited to 1300 seconds. Once the MIL is on, the follow-up test runs indefinitely.	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Fuel Level Sensor 1 Performance	P0461	This DTC will detect a fuel sender stuck in range in the primary fuel tank.	Delta Fuel Volume change over an accumulated 186 miles.	< 3 liters	Engine Running No active DTCs:	 VehicleSpeedSensor_FA	250 ms / sample Continuous	2 trips Type B
Fuel Level Sensor 1 Circuit Low Voltage	P0462	This DTC will detect a fuel sender stuck out of range low in the primary fuel tank.	Fuel level Sender % of 5V range	< 10 %	Run/Crank Voltage Run/Crank voltage goes to 0 volts at key off	11 volts ≤ Voltage ≤ 32 volts	100 failures out of 125 samples 100 ms / sample Continuous	2 trips Type B
Fuel Level Sensor 1 Circuit High Voltage	P0463	This DTC will detect a fuel sender stuck out ofrange high in the primary fuel tank.	Fuel level Sender % of 5V range	> 60 %	Run/Crank Voltage Run/Crank voltage goes to 0 volts at key off	11 volts ≤ Voltage ≤ 32 volts	100 failures out of 125 samples 100 ms / sample Continuous	2 trips Type B
Fuel Level Sensor 1 Circuit Intermittent	P0464	This DTC will detect intermittent fuel level sensor signals that would have caused the engine-off natural vacuum small leak test to abort due to an apparent re-fueling event.	If a change in fuel level is detected, the engine-off natural vacuum test is aborted due to an apparent refueling event. Subsequent to the abort, a refueling rationality test is executed to confirm that an actual refueling event occurred. If a refueling event is confirmed, then the test sample is considered passing. Otherwise, the sample is considered failing indicating an intermittent signal problem.		This test will execute whenever the engine-off natural vacuum small leak test (P0442) executes		This test is executed during an engine-off natural vacuum small leak test. The test can only execute up to once per engine-off period. The length of the test is determined by the refueling rationality test, which can take	1 trips Type A

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			An intermintant change in fuel level is defined as: The fuel level changes and does not remain for 30 seconds during a 600 second refueling rationality test.	 by 10 % > 10 %			up to 600 seconds to complete. The test will report a failure if 2 out of 3 samples are failures. 100 ms / sample	
Cooling Fan 1 Relay Control Circuit (ODM)	P0480	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Run/Crank Voltage Engine Speed	11 volts ≤ Voltage ≤ 32 volts ≥ 400 RPM	50 failures out of 63 samples 100 ms / sample Continuous with fan operation	2 trips Type B Not used on systems with Mechanical Fan)
Cooling Fan 2 Relay Control Circuit (ODM)	P0481	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Run/Crank Voltage Engine Speed	11 volts ≤ Voltage ≤ 32 volts ≥ 400 RPM	50 failures out of 63 samples 100 ms / sample Continuous with fan operation	2 trips Type B Not used on systems with Mechanical Fan)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Evaporative Emission (EVAP) System Flow During Non-Purge	P0496	This DTC will determine if the purge solenoid is leaking to engine manifold vacuum. This test will run with the purge valve closed and the vent valve closed.	Tank Vacuum for 5 seconds BEFORE Test time	> 2491 Pa ≥ refer to "P0496: Purge Valve Leak Test Engine Vacuum Test Time (Cold Start) as a Function of Fuel Level table" in Supporting Tables Tab.	Fuel Level System Voltage BARO Startup IAT Startup ECT Engine Off Time No active DTCs:	10% ≤ Percent ≤ 90% 11 volts ≤ Voltage ≤ 32 volts ≥ 70 kPa 4 °C ≤ Temperature ≤ 30 °C ≤ 35 °C ≥ 28800.0 seconds MAP_SensorFA TPS_FA VehicleSpeedSensor_FA IAT_SensorCircuitFA ECT_Sensor_FA AmbientAirDefault EnginePowerLimited P0443 P0449 P0452 P0453 P0454	Once per cold start Cold start: max time is 1000 seconds	2 trips Type B
Transmission Output Speed Sensor (TOSS)	P0502	No activity in the TOSS circuit	TOSS Raw Speed	≤ 60 RPM	Engine Torque Minimum Throttle opening Engine Speed Ignition voltage PTO	90.0 ≤ N-M ≤ 8191.8 ≥ 8.0 % 1500 ≤ RPM ≤ 6500 11.0 ≤ Volts ≤ 32.0 not active	≥ 4.5 sec	Type B 2 trips
					EngineTorqueEstInaccurate OR If KeETQC_b_MinTransRemedial = 1 (KeETQC_b_MinTransRemedial = 0)	FALSE Not MAF_SensorTFTKO Not MAP_SensorTFTKO Not EngineMisfireDetected_FA		
					P0503	Not failed this key cycle		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Transmission Output Speed Sensor (TOSS)	P0503	TOSS Signal Intermittent	Loop-to-Loop change in TOSS	≥ 350 RPM	Raw Output Speed Output Speed change Time since transfer case range change Ignition voltage Engine Speed Vehicle Speed PTO	> 300 RPM for ≥ 2.0 sec ≤ 150 RPM for ≥ 2.0 sec ≥ 6.0 sec 11.0 ≤ Volts ≤ 32.0 200 ≤ RPM ≤ 7500 for ≥ 5.0 seconds ≤ 318 MPH for ≥ 5.0 sec not active	≥ 3.3 sec	Type B 2 trips
Low Engine Speed Idle System	P0506	This DTC will determine if a low idle exists	Filtered Engine Speed Error	> 95.00 rpm	Baro	> 70 kPa	Diagnostic runs in every 12.5 ms loop	2 trips Type B
			filter coefficient	0.00375	Coolant Temp	> 60 °C and < 120 °C Must verify KfECTI_T_EngCoolHotLoThresh is less than KfECTI_T_EngCoolHotHiThresh	Diagnostic reports pass or fail in 10 seconds once all enable conditions are met	
					Engine run time	≥ 60 sec		
					Ignition voltage	32 ≥ volts ≥ 11		
					Time since gear change	≥ 3 sec		
					Time since a TCC mode change	> 3 sec		
					IAT	> -20 °C		
					Vehicle speed	≤ 2 mph		
					Commanded RPM delta	≤ 25 rpm		
					Idle time	> 10 sec		
					For manual transmissions: Clutch Pedal Position or Clutch Pedal Position	> 88.00 pct < 25.00 pct		
						PTO not active		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						Transfer Case not in 4WD LowState		
						Off-vehicle device control (service bay control) must not be active.		
						following conditions not TRUE: (VeTESR_e_EngSpdReqIntvType = CeTESR_e_EngSpdMinLimit AND VeTESR_e_EngSpdReqRespType = CeTESR_e_NoSuggestion)		
						Clutch is not depressed		
					No active DTCs	TC_BoostPresSnsrFA		
						ECT_Sensor_FA		
						EnginePowerLimited		
						EGRValveCircuit_FA		
						EGRValvePerformance_FA		
						IAT_SensorCircuitFA		
						EvapFlowDuringNonPurge_FA		
						FuelTrimSystemB1_FA		
						FuelTrimSystemB2_FA		
						FuelInjectorCircuit_FA		
						MAF_SensorFA		
						EngineMisfireDetected_FA		
						IgnitionOutputDriver_FA		
						TPS_FA		
						TPS_Performance_FA		
						VehicleSpeedSensor_FA		
						FuelLevelDataFault		
						LowFuelConditionDiagnostic		
						Clutch Sensor FA		
						AmbPresDfltdStatus		
						P2771		
					All of the above met for Idle time	> 10 sec		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
High Engine Speed Idle System	P0507	This DTC will determine if a high idle exists	Filtered Engine Speed Error	< -190.00 rpm	Baro	> 70 kPa	Diagnostic runs in every 12.5 ms loop	2 trips Type B
			filter coefficient	0.00375	Coolant Temp	> 60 °C and < 120 °C Must verify KfECTI_T_EngCoolHotLoThresh is less than KfECTI_T_EngCoolHotHiThresh	Diagnostic reports pass or fail in 10 seconds once all enable conditions are met	
					Engine run time	≥ 60 sec		
					Ignition voltage	32 ≥ volts ≥ 11		
					Time since gear change	≥ 3 sec		
					Time since a TCC mode change	> 3 sec		
					IAT	> -20 °C		
					Vehicle speed	≤ 2 mph		
					Commanded RPM delta	≤ 25 rpm		
					For manual transmissions: Clutch Pedal Position or Clutch Pedal Position	> 88.00 pct < 25.00 pct		
						PTO not active		
						Transfer Case not in 4WD LowState		
						Off-vehicle device control (service bay control) must not be active.		
						following conditions not TRUE: (VeTESR_e_EngSpdReqIntvType = CeTESR_e_EngSpdMinLimit AND VeTESR_e_EngSpdReqRespType = CeTESR_e_NoSuggestion)		
						Clutch is not depressed		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					No active DTCs	TC_BoostPresSnsrFA		
						ECT_Sensor_FA		
						EnginePowerLimited		
						EGRValveCircuit_FA		
						EGRValvePerformance_FA		
						IAT_SensorCircuitFA		
						EvapFlowDuringNonPurge_FA		
						FuelTrimSystemB1_FA		
						FuelTrimSystemB2_FA		
						FuelInjectorCircuit_FA		
						MAF_SensorFA		
						EngineMisfireDetected_FA		
						IgnitionOutputDriver_FA		
						TPS_FA		
						TPS_Performance_FA		
						VehicleSpeedSensor_FA		
						FuelLevelDataFault		
						LowFuelConditionDiagnostic		
						Clutch Sensor FA		
						AmbPresDfltdStatus		
						P2771		
					All of the above met for Idle time	> 10 sec		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Cold Start Rough Idle	P050D	Monitors the combustion performance when the cold start emission reduction strategy is active by accumulating and determining the percentage of engine cycles that have less than complete combustion relative to the total number of engine cycles in which Dual Pulse is active.	Deceleration index vs. Engine Speed Vs Engine load Deceleration index calculation is tailored to specific veh. Tables used are 1st tables encountered that are not max of range. Undetectable region at a given speed/load point is where all tables are max of range point. see Algorithm Description Document for additional details.	Incomplete combustion identified by P0300 threshold tables: (>Idle SCD AND >Idle SCD ddt Tables) OR (>Idle Cyl Mode AND > Idle Cyl Mode ddt Tables)	**Misfire Algorithm Enabled (Refer to P0300 for Enablement Requirements)**		Runs once per trip when the cold start emission reduction strategy is active and Dual Pulse is enabled and active. Frequency: Engine Cycle Test completes after Dual Pulse is no longer active OR The first 500 engine cycles have been reached	Type B 2 Trip(s)
					OBD Manufacturer Enable Counter	0		
					To enable the diagnostic, the Cold Start Emission Reduction Strategy Must Be Active per the following:			
					Catalyst Temperature	< 300.00 degC		
					AND			
					Engine Coolant	> -10.00 degC		
					In addition, Dual Pulse Strategy Is Enabled and Active Per the following:			
					Engine Speed	> 250.00 RPM		
					Engine Speed	<= 2600.00 RPM		
					Barometric Pressure	>= 70.00 KPa		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					For the engine speeds and loads in which Dual Pulse is active:			
					Dual Pulse Error induced misfires percentage	>= catalyst damaging misfire		
					Dual Pulse Error induced misfires percentage	< 90% of the maximum achieveable catalyst damaging misfire.		
					Engine Cycles	>= 50		
					Engine Cycles	< 501		
					The Cold Start Emission Reduction strategy must not be exiting. The strategy will exit per the following:			
					Catalyst Temperature	>= 800.00 degC		
					AND			
					Engine Run Time	>= 22.00 seconds		
					OR			
					Engine Run Time	> "KtCSEC_t_ExtendedEngineExit" in Supporting Tables Tab.		
					OR			
					Engine Coolant	>= 56.00 degC		
					Dual Pulse Strategy will exit per the following:			
					Engine Speed	> 2800.00 RPM		
					OR			
					Barometric Pressure	< 70.00 Kpa		
					Pedal position	<= 1.00 Pct		
					Dual Pulse Strategy will also exit if the any of the "Additional Dual Pulse Enabling Criteria" from below are not satisfied.			
					Additional Dual Pulse Enabling Criteria:			
					Green Engine Enrichment	Not Enabled		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Misfire Converter Protection strategy	not being requested		
					Engine Metal Overtemp strategy	not being requested		
					Fuel control state	Open Loop		
					Output State Control	Not being requested for fuel		
					DOD Or DFCO	Not Active		
					Power Enrichment	Not Active		
					Piston Protection	Not Active		
					Hot Coolant Enrichment	Not Active		
					Injector Flow Test	Not Active		
					General Enable			
					DTC's Not Set			
					AcceleratorPedalFailure			
					ECT_Sensor_FA			
					IAT_SensorCircuitFA			
					IAT2_SensorCircuitFA			
					CrankSensorFaultActive			
					FuelInjectorCircuit_FA			
					MAF_SensorFA			
					MAP_SensorFA			
					AnyCamPhaser_TFTKO			
					Clutch Sensor FA			
					IAC_SystemRPM_FA			
					IgnitionOutputDriver_FA			
					TPS_FA			
					VehicleSpeedSensor_FA			
					TransmissionEngagedState_FA			
					EngineTorqueInaccurate			
					FuelInjectorCircuit_TFTKO			
					FuelPumpRlyCktFA			
					FuelInjectorCircuit_FA			
					FRP_SnsrCkt_FA			
					FRP_SnsrCkt_TFTKO			
					HighPressPumpCkt_TFTKO			
					HighPressPumpCkt_FA			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Cruise Control Mutil-Functon Switch Circuit	P0564	Detect when cruise control multi-function switch circuit (analog) voltage is in an illegal range	Cruise Control analog circuit voltage must be in an "illegal range" for greater than a calibratable period of time for cruise switch states that are received over serial data		CAN cruise switch diagnostic enable in ECM	Enabled	fail continuously for greater than 0.700 seconds	Type: C MIL: NO Trips: 1
Cruise Control Resume Circuit	P0567	Detects a failure of the cruise resume switch in a continously applied state	Cruise Control Resume switch remains applied for greater than a calibratable period of time for architecture where cruise switch states are received over serial data		CAN cruise switch diagnostic enable in ECM	Enabled	fail continuously for greater than 90.000 seconds	Type: C MIL: NO Trips: 1
Cruise Control Set Circuit	P0568	Detects a failure of the cruise set switch in a continously applied state	Cruise Control Set switch remains applied for greater than a calibratable period of time for architecture where cruise switch states are received over serial data		CAN cruise switch diagnostic enable in ECM	Enabled	fail continuously for greater than 90.000 seconds	Type: C MIL: NO Trips: 1

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Cruise Control Input Circuit	P0575	Detects rolling count or protection value errors in Cruise Control Switch Status serial data signal	If x of y rolling count / protection value faults occur, disable cruise for duration of fault		Cruise Control Switch Serial Data Error Diagnostic Enable	Enabled	10/16 counts	Type: C MIL: NO Trips: 1
Control Module Read Only Memory (ROM)	P0601	This DTC will be stored if the calibration check sum is incorrect or the flash memory detects an uncorrectable error via the Error Correcting Code.	The Primary Processor's calculated checksum does not match the stored checksum value. Covers all software and calibrations.	1 failure if the fault is detected during the first pass. 5 failures if the fault occurs after the first pass is complete.			Diagnostic runs continuously in the background	Trips: 1 Type: A MIL: YES
			The Primary Processor's Error Correcting Code hardware in the flash memory detects an error. Covers all software and calibrations.	254 failures detected via Error Correcting Code			Diagnostic runs continuously via the flash hardware	
			The Primary Processor's calculated checksum does not match the stored checksum value for a selected subset of the calibrations.	2 consecutive failures detected or 5 total failures detected.			Diagnostic runs continuously. Will report a detected fault within 200 ms.	
			The Secondary Processor's calculated checksum does not match the stored checksum value. Covers all software and calibrations.	1 failure if the fault is detected during the first pass. 5 failures if the fault occurs after the first pass is complete.			Diagnostic runs continuously in the background	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
				In all cases, the failure count is cleared when controller shuts down				
Control Module Not Programmed	P0602	This DTC will be stored if the PCM is a service PCM that has not been programmed.	Output state invalid		PCM State	= crank or run PCM is identified through calibration as a Service PCM	Diagnostic runs at powerup and once per second continuously after that	Type A 1 trips
Control Module Long Term Memory Reset	P0603	Non-volatile memory checksum error at controller power-up	Checksum at power-up does not match checksum at power-down				Diagnostic runs at powerup Diagnostic reports a fault if 1 failure occurs	Type A 1 trips
ECM RAM Failure	P0604	Indicates that the ECM has detected a RAM fault:						Trips: 1 Type: A
		Primary Processor System RAM Fault	Indicates that the primary processor is unable to correctly read data from or write data to system RAM. Detects data read does not match data written >=	254 counts			Will finish first memory scan within 30 seconds at all engine conditions - diagnostic runs continuously (background loop)	MIL: YES
		Primary Processor Cache RAM Fault	Indicates that the primary processor is unable to correctly read data from or write data to cached RAM. Detects data read does not match data written >=	254 counts			Will finish first memory scan within 30 seconds at all engine conditions - diagnostic runs continuously (background loop)	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		Primary Processor TPU RAM Fault	Indicates that the primary processor is unable to correctly read data from or write data to TPU RAM. Detects data read does not match data written >=	5 counts			Will finish first memory scan within 30 seconds at all engine conditions - diagnostic runs continuously (background loop)	
		Primary Processor Update Dual Store RAM Fault	Indicates that the primary processor detects a mismatch between the data and dual data is found during RAM updates. Detects a mismatch in data and dual data updates >	0.46250 seconds			When dual store updates occur.	
		Primary Processor Write Protected RAM Fault	Indicates that the primary processor detects an illegal write attempt to protected RAM. Number of illegal writes are >	65534 counts			Diagnostic runs continuously (background loop)	
		Secondary Processor RAM Fault	Indicates that the secondary processor is unable to correctly read data from or write data to system RAM. Detects data read does not match data written >=	254 counts			Will finish first memory scan within 30 seconds at all engine conditions, diagnostic runs continuously (background loop)	
Internal ECM Processor Integrity Fault	P0606	Indicates that the ECM has detected an internal processor integrity fault:						Trips: 1 Type: A MIL: YES

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		Primary Processor SPI Fault Detected	Loss or invalid message of SPI communication from the Secondary Processor at initialization detected by the Primary Processor or loss or invalid message of SPI communication from the Secondary Processor after a valid message was recieved by the Primary Processor	Loss or invalid message at initialization detected or loss or invalid message after a valid message was recieved		Run/Crank voltage >= 6.40 or Run/Crank voltage >= 11.00, else the failure will be reported for all conditions	In the primary processor, 159/399 counts intermittent or 39 counts continuous; 39 counts continuous @ initialization. 12.5 ms /count in the ECM main processor	
		Secondary Processor SPI Fault Detected	Loss or invalid message of SPI communication from the Primary Processor at initialization detected by the Secondary Processor or loss or invalid message of SPI communication from the Primary Processor after a valid message was recieved by the Secondary Processor	Loss or invalid message at initialization detected or loss or invalid message after a valid message was recieved			In the secondary processor, 159/399 counts intermittent or 0 counts continuous; 0 counts continuous @ initialization. 12.5 ms /count in the ECM main processor	
		Secondary Processor Stack Fault	Checks for stack over or underflow in secondary processorby looking for corruption of known pattern at stack boundaries. Checks number of stack over/under flow since last powerup reset >=	5		KeMEMD_b_StackLimitTestEnbl == 1 Value of KeMEMD_b_StackLimitTestEnbl is: 1.	variable, depends on length of time to corrupt stack	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		Secondary processor received incorrect Keys	MAIN processor is verified by responding to a seed sent from the secondary with a key response to secondary. Checks number of incorrect keys received > or Secondary processor has not received a new within time limit	2 incorrect seeds within 8 messages		Ignition in Run or Crank	150 ms for one seed continually failing	
		MAIN processor did not receive seed within time limit	Time new seed not received exceeded			always running	0.450 seconds	
		MAIN processor test for seeds to arrive in a known sequence	MAIN processor receives seed in wrong order			always running	3 / 17 counts intermittent. 50 ms/count in the ECM main	
		Secondary processor ALU check	2 fails in a row in the Secondary processor's ALU check			KePISD_b_ALU_TestEnbld == 1 Value of KePISD_b_ALU_TestEnbld is: 1.	25 ms	
		Secondary processor register configuration check	2 fails in a row in the Secondary processor's configuration register masks versus known good data			KePISD_b_ConfigRegTestEnbld == 1 Value of KePISD_b_ConfigRegTestEnbld is: 1.	12.5 to 25 ms	
		MAIN processor discrete fault:	Secondary processor detects an error in the toggling of a hardware discrete line controlled by the MAIN processor			KePISD_b_MainCPU_SOH_FltEnbld == 1 Value of KePISD_b_ConfigRegTestEnbld is: 1.	50 ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		MAIN detected corruption in throttle or pedal critical RAM data	memory and complement memory do not agree				0.19 seconds	
		MAIN Processor Performance Check	1. Software tasks loops > schedule tasks loop 2. 12.5ms task loop sequence does not complete >=	See supporting tables 0.19 seconds		KePISD_b_SeedUpdKeyStorFltEnbl== 1 Value of KePISD_b_SeedUpdKeyStorFltEnbl is: 1. KePISD_b_12p5msSeqTestEnbld== 1 Value of KePISD_b_12p5msSeqTestEnbld is: 1.	Error > 5 times of loop time; loop times are 6.25, 12.5, 25 ms in the main processor	
		MAIN Processor Performance Check	Software background task first pass time to complete exceeds		Powertrain relay	> 6.41 V	360.000 seconds	
		MAIN processor ALU check	2 fails in a row in the MAIN processor's ALU check			KePISD_b_ALU_TestEnbld == 1 Value of KePISD_b_ALU_TestEnbld is: 1.	25 ms	
		MAIN processor configuration register check	2 fails in a row in the MAIN processor's configuration register masks versus known good data			KePISD_b_ConfigRegTestEnbld == 1 Value of KePISD_b_ConfigRegTestEnbld is: 1.	12.5 to 25 ms	
		MAIN Stack Fault	Checks number of stack over/under flow since last powerup reset >=	5		KeMEMD_b_StackLimitTestEnbl == 1 Value of KeMEMD_b_StackLimitTestEnbl is: 1.	variable, depends on length of time to corrupt stack	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		MAIN processor ADC test	Voltage deviation >	0.495		KePISD_b_A2D_CnvrtrTestEnbld == 1 Value of KePISD_b_A2D_CnvrtrTestEnbld is: 1.	3 / 8 counts or 0.150 seconds continuous; 50 ms/count in main processor	
		Flash ECC Fault	Checks for ECC (error correcting code) circuit test errors reported by the hardware for flash memory. Increments counter during controller initialization if ECC error occured since last controller initialization. Counter >=	3 (results in MIL), 5(results in MIL and remedial action)		KeMEMD_b_FlashECC_CktTestEnbl == 1 Value of KeMEMD_b_FlashECC_CktTestEnbl is: 1.	variable, depends on length of time to access flash with corrupted memory	
		RAM ECC Fault	Checks for ECC (error correcting code) circuit test errors reported by the hardware for RAM memory circuit. Increments counter during controller initialization if ECC error occured since last controller initialization. Counter >=	3 (results in MIL), 5 (results in MIL and remedial action)		KeMEMD_b_RAM_ECC_CktTestEnbl == 1 Value of KeMEMD_b_RAM_ECC_CktTestEnbl is: 1.	variable, depends on length of time to access flash with corrupted memory	
Fuel Pump Relay Control Circuit Open	P0627	This DTC checks for an open and shorted high circuit while the device is commanded off.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Run/Crank Voltage Engine Speed	11 volts ≤ Voltage ≤ 32 volts ≥ 0 RPM	8 failures out of 10 samples 250 ms / sample Continuous with device off	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Fuel Pump Relay Control Circuit Low Voltage	P0628	This DTC checks for a shorted low circuit while the device is commanded on.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Run/Crank Voltage Engine Speed	11 volts ≤ Voltage ≤ 32 volts ≥ 0 RPM	8 failures out of 10 samples 250 ms / sample Continuous with device on	2 trips Type B
Fuel Pump Relay Control Circuit High Voltage	P0629	This DTC checks for an open and shorted high circuit while the device is commanded off.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Run/Crank Voltage Engine Speed	11 volts ≤ Voltage ≤ 32 volts ≥ 0 RPM	8 failures out of 10 samples 250 ms / sample Continuous with device off	2 trips Type B
Internal Control Module Fuel Injector Control Performance	P062B	This DTC checks the circuit for electrical integrity during operation.	Internal ECU Boost Voltage OR Internal ECU Boost Voltage OR Driver Status OR Driver Status	≥ 90 Volts ≤ 40 Volts = Not Ready = Uninitialized	Battery Voltage	8.0 ≤ Volts ≤ 32.0 Enabled when a code clear is not active or not exiting device control Engine is not cranking	High Voltage - 160 failures out of 200 samples Low Voltage - 160 failures out of 200 samples Driver Status Not Ready- 160 failures out of 200 samples Driver Status Uninitialized - Uninitialized state for ≥ 100 counts All at 12.5ms per sample	1 trips Type A

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Control Module EEPROM Error	P062F	Indicates that the NVM Error flag has not been cleared	The next write to NVM will not succeed or the assembly calibration integrity check failed.		Ignition State	= unlock/accesory, run, or crank	1 test failure Diagnostic runs once at powerup	Type A 1 trips
VIN Not Programmed or Mismatched - Engine Control Module (ECM)	P0630	This DTC checks VIN is correctly written	At least one of programed VIN's digit	= 00 or FF	OBD Manufacturer Enable Counter	= 0	250 ms / test Continuous	Type A 1 trips
5 Volt Reference #1 Circuit	P0641	Detects a continuous or intermittent short on th 5 volt reference circuit #1	ECM Vref1 < or ECM Vref1 > or the difference between ECM filtered Vref1 and Vref1 >	4.875 5.125 0.05		Run/Crank voltage or Powertrain relay voltage > 6.41 and reduced power is false, else the failure will be reported for all conditions	19/39 counts or 0.1875 sec continuous; 12.5 ms/count in main processor	Trips: 1 Type: A MIL: YES
Malfunction Indicator Lamp (MIL) Control Circuit (ODM)	P0650	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Run/Crank Voltage Remote Vehicle Start is not active	11 volts ≤ Voltage ≤ 32 volts	20 failures out of 25 samples 250 ms / sample Continuous	2 trip Type B NO MIL
5 Volt Reference #2 Circuit	P0651	Detects a continuous or intermittent short on th 5 volt reference circuit #2	ECM Vref2 < or ECM Vref2 > or the difference between ECM filtered Vref2 and Vref2 >	4.875 5.125 0.05		Run/Crank voltage or Powertrain relay voltage > 6.41 and reduced power is false, else the failure will be reported for all conditions	19/39 counts or 0.1875 sec continuous; 12.5 ms/count in main processor	Trips: 1 Type: A MIL: YES
Powertrain Relay Control (ODM)	P0685	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Run/Crank Voltage	11 volts ≤ Voltage ≤ 32 volts	8 failures out of 10 samples 250 ms / sample Continuous	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Powertrain Relay Feedback Circuit High	P0690	This DTC is a check to determine if the Powertrain relay is functioning properly.	PT Relay feedback voltage is Stuck Test: PT Relay feedback voltage is when commanded 'OFF'	≥ 18 volts > 2 volts	Powertrain relay commanded "ON" No active DTCs:	PowertrainRelayStateOn_FA	5 failures out of 6 samples 1 second / sample Stuck Test: 100 ms/ sample Continous failures ≥ 4 seconds	2 trips Type B
5 Volt Reference #3 Circuit	P0697	Detects a continuous or intermittent short on th 5 volt reference circuit #1	ECM Vref3 < 4.875 or ECM Vref3 > 5.125 or the difference between ECM filtered Vref3 and Vref3 > 0.05			Run/Crank voltage or Powertrain relay voltage > 6.41 and reduced power is false, else the failure will be reported for all conditions	19/39 counts or 0.1875 sec continuous; 12.5 ms/count in main processor	Trips: 1 Type: A MIL: YES
Fuel Pump Control Module (FPCM) Requested MIL Illumination	P069E	Monitors the FPCM MIL request line to determine when the FPCM has detected a MIL illuminating fault.	Fuel Pump Control Module Emissions-Related DTC set			Time since power-up > 3 seconds	Continuous	Type A 1 trips MIL: NO
5 Volt Reference #4 Circuit	P06A3	Detects a continuous or intermittent short on th 5 volt reference circuit #2	ECM Vref4 < 4.875 or ECM Vref4 > 5.125 or the difference between ECM filtered Vref3 and Vref3 > 0.05			Run/Crank voltage or Powertrain relay voltage > 6.41 and reduced power is false, else the failure will be reported for all conditions	19/39 counts or 0.1875 sec continuous; 12.5 ms/count in main processor	Trips: 1 Type: A MIL: YES

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Internal Control Module Knock Sensor Processor 1 Performance	P06B6	This diagnostic checks for a fault with the internal test circuit used only for the '20 kHz' method of the Open Circuit Diagnostic	Gated FFT Diagnostic Output (VaKNKD_k_OpenTestCktIntFilter[0])	> OpenTestThreshLo **and** < OpenTestThreshHi See Supporting Tables	Diagnostic Enabled?	Enabled	First Order Lag Filter with Weight Coefficient	Type: B MIL: YES Trips: 2
					Engine Speed	> 400 RPM and < 5000 RPM		
					Engine Air Flow	≥ 0 mg/cylinder and ≤ 2000 mg/cylinder	Weight Coefficient = 0.0100 Updated each engine event	
					Engine running	≥ 7.5 seconds		
Internal Control Module Knock Sensor Processor 2 Performance	P06B7	This diagnostic checks for a fault with the internal test circuit used only for the '20 kHz' method of the Open Circuit Diagnostic	Gated FFT Diagnostic Output (VaKNKD_k_OpenTestCktIntFilter[1])	> OpenTestThreshLo **and** < OpenTestThreshHi See Supporting Tables	Diagnostic Enabled?	Enabled	First Order Lag Filter with Weight Coefficient	Type: B MIL: YES Trips: 2
					Engine Speed	> 400 RPM and < 5000 RPM		
					Engine Air Flow	≥ 0 mg/cylinder and ≤ 2000 mg/cylinder	Weight Coefficient = 0.0100 Updated each engine event	
					Engine running	≥ 7.5 seconds		
Transmission Control Module (TCM) Requested MIL Illumination	P0700	Monitors the TCM MIL request line to determine when the TCM has detected a MIL illuminating fault.	Transmission Emissions-Related DTC set			Time since power-up > 3 seconds	Continuous	Type A 1 trips MIL: NO
Clutch Pedal Position Sensor Circuit Range / Performance	P0806	Detects if Clutch Pedal Position Sensor is Stuck in a range indicative of a vehicle NOT in gear, when the vehicle is determined to be in gear. Gear determination is made by verifying that engine RPM/ Trans Output	Filtered Clutch Pedal Position Error when the vehicle is determined to be in gear	> 4 %	N/TOS Ratio	Must match actual gear (i.e. vehicle in gear)	25 ms loop Continuous	1 Trip(s) Type A
					Transfer Case	Not in 4WD Low range		
					vehicle speed	> 10 MPH		
					Engine Torque	> **EngTorqueThreshold** Table		
					Clutch Pedal Position	< **ResidualErrEnableLow** Table		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		Speed (N/TOS) ratio represents a valid gear.			**OR**			
					Clutch Pedal Position	> ***ResidualErrEnableHigh*** *Table*		
					No Active DTCs:			
					ClutchPositionSensorCktLo FA ClutchPositionSensorCkitHi FA CrankSensorFA Trans Output Shaft Angular Velocity Validity VehicleSpeedSensor_FA			
Clutch Pedal Position Sensor Circuit Low	P0807	Detects Continuous Circuit Short to Low or Open	Clutch Position Sensor Circuit	< 4 % of Vref	Engine Not Cranking System Voltage	> 11.0 Volts	25 ms loop Continuous	1 Trip(s)
			for	200 counts out of 250 samples	No active DTCs:	5VoltReferenceB_FA		Type A
Clutch Pedal Position Sensor Circuit High	P0808	Detects Continuous Circuit Short to High	Clutch Position Sensor Circuit	> 96 % of Vref	Engine Not Cranking System Voltage	> 11.0 Volts	25 ms loop Continuous	1 Trip(s)
			for	200 counts out of 250 samples	No active DTCs:	5VoltReferenceB_FA		Type A
Clutch Pedal Position Not Learned	P080A	Monitor for Valid Clutch Pedal Fully Applied Learn Position values	Fully Applied Learn Position	< 14.3 %	OBD Manufacturer Enable Counter	= 0	250 ms loop Continuous	1 Trip(s)
			OR					Type C
			Fully Applied Learn Position	> 42.8 %				
Traction Control Torque Request Circuit	P0856	Determines if torque request from the EBTCM is valid	Serial Communication 2's complement message - ($140 for PPEI2 or $1C9 for PPEI3, $1CA for Hybrid))	Message <> 2's complement of message	Serial communication to EBTCM (U0108)	No loss of communication	**<u>All except Class2 PWM:</u>** Count of 2's complement values not equal >= 10 Performed every 12.5 msec	
					Power Mode Engine Running	= Run = True		
			OR					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Serial Communication message ($140 for PPEI2 or $1C9 for PPEI3, $1CA for Hybrid)) rolling count value	Message rolling count value <> previous message rolling count value plus one	Status of traction in GMLAN message ($4E9)	= Traction Present	10 rolling count failures out of 10 samples Performed every 12.5 msec	
			OR					
			Too many minimum limit torque request transitions occur from TRUE to FALSE to TRUE within a time period	Requested torque intervention type toggles from not increasing request to increasing request			>= 3 multi-transitions out of 5 samples. Performed every 200 ms	1 trip(s) Special Type C
			Torque request greater than torque request diagnostic maximum threshold	> 250 Nm for engine based traction torque system, > 4000 Nm for axle based traction torque system			>= 4 out of 10 samples Performed every 12.5 msec	
Inlet Airflow System Performance	P1101	Determines if there are multiple air induction problems affecting airflow and/or manifold pressure.	See table "Turbocharger Intake Flow Rationality Diagnostic Failure Matrix" for combinations of model failures that can set this DTC.		Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together)	>= 400 RPM <= 6000 RPM > -7 Deg C < 125 Deg C > -20 Deg C < 125 Deg C	Continuous Calculation are performed every 12.5 msec	Type B 2 trips
			MAF model fails when			>= 0.00		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			ABS(Measured Flow – Modeled Air Flow) Filtered	> 20 grams/sec		Modeled Air Flow Error multiplied by MAF Residual Weight Factor based on RPM and MAF Residual Weight Factor Based on MAF Est		
			MAP1 model fails when ABS(Measured MAP – MAP Model 1) Filtered	> 24.0 kPa		MAP Model 1 Error multiplied by MAP1 Residual Weight Factor based on RPM		
			MAP2 model fails when ABS(Measured MAP – MAP Model 2) Filtered	> 22.0 kPa		MAP Model 2 Error multiplied by MAP2 Residual Weight Factor based on RPM		
			MAP3 model fails when ABS(Measured MAP – MAP Model 3) Filtered	> 22.0 kPa		MAP Model 3 Error multiplied by MAP Residual Weight Factor based on RPM		
			TIAP1 model fails when ABS(Measured TIAP – TIAP Model 1) Filtered	> 24.0 kPa		TIAP Model 1 Error multiplied by TIAP Residual Weight Factor based on RPM		
			TPS model fails when Filtered Throttle Model Error	> 200 kPa*(g/s)		Filtered Throttle Model Error multiplied by TPS Residual Weight Factor based on RPM		
			TIAP Correlation model fails when High Engine Air Flow is TRUE AND Measured TIAP - measured MAP - offset as a function of engine speed See table "TIAP-MAP Correlation Offset"	> 24.0 kPa	No Active DTCs: MAP_SensorCircuitFA EGRValve_FP EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA ECT_Sensor_Ckt_FP	See table "IFRD Residual Weighting Factors".		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			OR Low Engine Air Flow is TRUE AND Measured TIAP - measured Baro - offset as a function of engine speed See table "TIAP-Baro Correlation Offset" TIAP Correlation is valid when High Engine Air Flow has been TRUE for a period of time OR High Engine Air Flow has been TRUE for a period of time High Engine Air Flow is TRUE when Mass Air Flow AND Manifold Pressure	> 24.0 kPa > 1.0 seconds > 1.0 seconds > a threshold in gm/sec as a function of engine speed See table "TIAP-MAP Correlation Min Air Flow" > a threshold in kPa as a function of engine speed See table "TIAP-MAP Correlation Min MAP"		IAT_SensorFA IAT_SensorCircuitFP IAT2_SensorFA IAT2_SensorCircuitFP TC_BoostPresSnsrCktFA AmbientAirDefault		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			AND Filtered Mass Air Flow - Mass Air Flow Low Engine Air Flow is TRUE when Mass Air Flow AND Manifold Pressure AND Mass Air Flow - Filtered Mass Air Flow	< 3.0 gm/sec < a threshold in gm/sec as a function of engine speed See table "TIAP-Baro Correlation Max Air Flow" < a threshold in kPa as a function of engine speed See table "TIAP-Baro Correlation Max MAP" < 2.0 gm/sec				
O2S Insufficient Switching Bank 1 Sensor 1	P1133	This DTC determines if the O2 sensor is no longer sufficiently switching.	Fault condition present if Half Cycle L/R or R/L Switches are below the threshold.	H/C L/R switches < Threshold, or H/C R/L switches < Threshold, (refer to table named "P1133 - O2S HC L to R Switches Limit Bank 1 Sensor 1" Pass/Fail Threshold table & "P1133 - O2S HC R to L Switches Limit Bank 1 Sensor 1" Pass/Fail Threshold table in	No Active DTC's	TPS_ThrottleAuthorityDefaulted MAP_SensorFA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault MAF_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA	Sample time is 60 seconds Frequency: Once per trip	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
				Supporting tables tab)		AIR System FA EthanolCompositionSensor_FA EngineMisfireDetected_FA		
				< 5	Bank 1 Sensor 1 DTC's not active	= P0131, P0132 or P0134		
					System Voltage	10.0 < Volts < 32.0		
			OR					
					EGR Device Control	= Not active		
			Slope Time L/R Switches	< 5	Idle Device Control	= Not active		
					Fuel Device Control	= Not active		
			OR		AIR Device Control	= Not active		
					Low Fuel Condition Diag	= False		
			Slope Time R/L Switches		Green O2S Condition	= Not Valid, See definition of **Green Sensor Delay Criteria (B1S1)** in Supporting Tables tab.		
					O2 Heater on for	≥ 40 seconds		
					Learned Htr resistance	= Valid		
					Engine Coolant	> 69 ºC		
					IAT	> -40 ºC		
					Engine run Accum	> 60 seconds		
					Time since any AFM status change	> 2.0 seconds		
					Time since Purge On to Off change	> 0.0 seconds		
					Time since Purge Off to On change	> 1.5 seconds		
					Purge duty cycle	≥ 0 % duty cycle		
					Engine airflow	10 ≤ gps ≤ 50		
					Engine speed	1000 ≤ RPM ≤ 3500		
					Fuel	< 87 % Ethanol		
					Baro	> 70 kpa		
					Air Per Cylinder	≥ 100 mgrams		
					Low Fuel Condition Diag	= False		
					Fuel Control State	= Closed Loop		
					Closed Loop Active	= TRUE		
					LTM fuel cell	= Enabled		
					Transient Fuel Mass	≤ 100.0 mgrams		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Baro Fuel Control State Fuel State Commanded Proportional Gain **All of the above met for** Time	= Not Defaulted not = Power Enrichment DFCO not active ≥ 0.0 % > 3.0 seconds		
Injector 1 low side circuit shorted to high side circuit	P1248	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the fuel injector high side is shorted to low side		Battery Voltage Engine Run Time	11 ≤ Volts ≤ 32 ≥ 5 Sec P062B not FA or TFTKO	10 failures out of 20 samples 100 ms /sample Continuous	1 trips Type A
Injector 2 low side circuit shorted to high side circuit	P1249	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the fuel injector high side is shorted to low side		Battery Voltage Engine Run Time	11 ≤ Volts ≤ 32 ≥ 5 Sec P062B not FA or TFTKO	10 failures out of 20 samples 100 ms /sample Continuous	1 trips Type A
Injector 3 low side circuit shorted to high side circuit	P124A	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the fuel injector high side is shorted to low side		Battery Voltage Engine Run Time	11 ≤ Volts ≤ 32 ≥ 5 Sec P062B not FA or TFTKO	10 failures out of 20 samples 100 ms /sample Continuous	1 trips Type A
Injector 4 low side circuit shorted to high side circuit	P124B	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the fuel injector high side is shorted to low side		Battery Voltage Engine Run Time	11 ≤ Volts ≤ 32 ≥ 5 Sec P062B not FA or TFTKO	10 failures out of 20 samples 100 ms /sample Continuous	1 trips Type A
Ignition Coil Positive Voltage Circuit Group 1	P135A	This diagnostic checks for voltage supply to the Ignition Coils	Ignition Module Supply Voltage.	< 2.5 Volts	Diagnostic Enabled/Disabled	Enabled	50 Failures out of 63 Samples 6.25 msec rate	Type: A MIL: YES Trips: 1
			Three possible power supply sources for Ignition Coils (1. Battery, 2. Ignition Run/Crank, or 3. PT Relay).	Ignition Coil Power Source:	PT_Relay			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
				Additional enable criteria if Ignition Coil Power Source is **'Battery'** (does not apply if Ignition Coil Power Source is either 'Run/Crank' or 'PT Relay' voltage).	PT Relay Voltage	> 11.0 (volts) and < 32.0 (volts)		
					Delay time starting at Key-On	0 (msec)		
Cold Start Emissions Reduction System Fault	P1400	Model based test computes power from exhaust flow and thermal energy resulting from elevated idle speed and retarded spark advance. Detects if the cold start emission reduction system has failed resulting in the delivered power being out of range.	Average desired accumulated exhaust power - Average estimated accumulated exhaust power OR Average desired accumulated exhaust power - Average estimated accumulated exhaust power (EWMA filtered)	< -32.00 KJ/s (high RPM failure mode) > 4.00 KJ/s (low RPM failure mode)	**To enable the diagnostic, the Cold Start Emission Reduction Strategy must be Active per the following:**		Runs once per trip when the cold start emission reduction strategy is active Frequency: 100ms Loop Test completes after 10 seconds of accumulated qualified data.	Type A 1 Trip(s)
					Catalyst Temperature	< 300.00 degC		
					AND			
					Engine Coolant	> -10.00 degC		
					The Cold Start Emission Reduction strategy must not be exiting. The strategy will exit per the following:			
					Catalyst Temperature	>= 800.00 degC		
					AND			
					Engine Run Time	>= 22.00 seconds		
					OR			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Engine Run Time	> "KtCSEC_t_ExtendedEngineExit" in Supporting Tables Tab.		
					OR			
					Engine Coolant	>= 56.00 degC		
					Other Enable Criteria			
					Vehicle Speed	< 1.24 MPH		
					Driver must be off the accel pedal. This checks that the final accel pedal position (comprehending deadband and hysteresis) is essentially zero.			
					A change in throttle position (tip-in/tip-out) will initiate a delay in the calculation of the average qualified residual value. When the			
					OBD Manufacturer Enable Counter	0		
					Pedal Close Delay Timer	> 2.00 seconds		
					the diagnostic will continue the calculation.			
					Clutch Pedal Top of Travel Achieved and Clutch Pedal Bottom of Travel Achieved. **Refer to the "Clutch Pedal Top of Travel Achieved criteria"** and **"Clutch Pedal Bottom of Travel Achieved criteria"** section of the "Supporting Tables" tab criteria			
					Idle Speed Control System	Active		
					General Enable			
					DTC's Not Set			
					AcceleratorPedalFailure			
					ECT_Sensor_FA			
					IAT_SensorCircuitFA			
					IAT2_SensorCircuitFA			
					CrankSensorFaultActive			
					FuelInjectorCircuit_FA			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					MAF_SensorFA			
					MAP_SensorFA			
					EngineMisfireDetected_FA			
					Clutch Sensor FA			
					IAC_SystemRPM_FA			
					IgnitionOutputDriver_FA			
					P050A (ColdStrt_IAC_SysPerf)			
					P050B (ColdStrtIgnTmngPerf)			
					TPS_FA			
					VehicleSpeedSensor_FA			
					5VoltReferenceMAP_OOR_Flt			
					TransmissionEngagedState_FA			
					EngineTorqueInaccurate			
Transmission Engine Speed Request Circuit	P150C	Determines if engine speed request from the TCM is valid	Serial Communication rolling count value	+ 1 from previous $19D message (PTEI3)	Diagnostic enable bit	1	Diagnostic runs in 12.5 ms loop	2 trips Type B
			Transmission engine speed protection	not equal to 2's complement of transmission engine speed request + Transmission alive rolling count	Engine run time	0.50 sec		
					# of Protect Errors	10 protect errors out of 10 samples		
					# of Alive Rolling Errors	6 rolling count errors out of 10 samples		
					No idle diagnostic 506/507 code	IAC_SystemRPM_FA		
					No Serial communication loss to TCM	(U0101)		
					Engine Running	= TRUE		
					Power mode	Run Crank Active		
Steady State Actuation Fault	P1516	Detect an inablity to maintain a steady state throttle position	Throttle is considered to be steady state when: Change in throttle position over 12.5 msec is < 4.00 seconds	0.25 percent		Run/crank voltage or Powertrain relay voltage > 6.41 and reduced power is false, else the failure will be reported for all conditions	0.49 ms	Trips: 1 Type: A MIL: YES

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Internal Control Module SIDI High Pressure Pump current monitor	P163A	This DTC checks the current from the control area and compares it with calibrated thresholds to set current high and low flags	SIDI fuel pump High Current Test Current SIDI fuel pump Low Current Test Current	≥ 11.00 Amps ≤ 0.10 Amps	Battery Voltage Low Side Fuel Pressure Engine Run Time	11 <= Volts <= 32 > 0.250 MPa >= KtFHPD_t_PumpCntrlEngRunThrsh (see supporting tables) Enabled when a code clear is not active or not exiting device control Engine is not cranking	Current High - 750 failures out of 938 samples Current Low - 750 failures out of 938 Samples	2 trips Type B
					Additional Enable Criteria:			
					Barometric Pressure Inlet Air Temp Fuel Temp	High Pressure Pump is enabled >= 70.0 >= -10.0 -10 ≤ Temp degC ≤ 100 Estimate fuel rail pressure is valid Green Engine (In assembly plant) is not enabled Not LowFuelConditionDiagnostic Low side Fuel Pump is on Injector Flow Test is not active Device control commanded pressure is false Device control pump ckt enabled on is false Engine movement detected is true (Function of crankshaft and camshaft position) Manufacturers enable counter is 0		
					DTCs not Active:	FHPR_b_FRP_SnsrCkt_FA FHPR_b_FRP_SnsrCkt_TFTKO FHPR_b_PumpCkt_FA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						FHPR_b_PumpCkt_TFTKO CrankSensorFA CamSensorFA IAT_SensorFA IAT2_SensorFA ECT_Sensor_FA FHPR_b_PumpCkt_FA Ethanol Composition Sensor FA PowertrainRelayFault		
Ignition Voltage Correlation	P1682	Detect a continuous or intermittent out of correlation between the Run/Crank Ignition Voltage & the Powertrain Relay Ignition Voltage	|Run/Crank – ETC Run/Crank| >	3.00 Volts	Powertrain commanded on and Run/crank voltage > or ETC Run/crank voltage > and Run/crank voltage >	Table, f(IAT). See supporting tables 5.5 5.5	240/480 counts or 0.1750sec continuous; 12.5 ms/count in main processor	Trips: 1 Type: A MIL: YES
Internal Control Module Redundant Memory Performance	P16F3	Detect Processor Calculation faults due to RAM corruptions, ALU failures and ROM failures						Trips: 1 Type: A MIL: YES
			Desired engine torque request greater than redundant calculation plus threshold	52.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Cylinders active greater than commanded	1 cylinder		Engine speed greater than 0rpm and less than 3200rpm	Up/down timer 2048 ms continuous, 0.5 down time multipier	Not used Series 11

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Difference between Cruise Axle Torque Arbitrated Request and Cruise Axle Torque Request exceeds threshold	97.62 Nm		Cruise has been engaged for more than 4.00 seconds	Up/down timer 2048 ms continuous, 0.5 down time multipier	Not used Series 11
			Engine min capacity above threshold	53.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 100 ms continuous, 0.5 down time multipier	
			No fast unmanaged retarded spark above the applied spark plus the threshold	Table, f(Erpm). See supporting tables		Engine speed greater than 0rpm	Up/down timer 150 ms continuous, 0.5 down time multipier	
			Absolute difference of adjustment factor based on temperature and its dual store above threshold	2.76 m/s		Ignition in unlock/accessory, run or crank	Up/down timer 138 ms continuous, 0.5 down time multipier	
			1) Absolute difference of redundant calculated engine speed above threshold 2)Time between lores events and its dual store do not match	KeEPSD_n_LoresSecurBndry 500 RPM		Engine speed greater than 0 RPM	Up/down timer 150 ms continuous, 0.5 down time multipier	
			After throttle blade pressure and its dual store do not match	N/A		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Speed Control's Preditcted Torque Request and its dual store do not match	N/A		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Engine oil temperature and its dual store do not match	N/A		Ignition in unlock/accessory, run or crank	Up/down timer 325 ms continuous, 0.5 down time multipier	
			Desired throttle position greater than redundant calculation plus threshold	10.00 percent		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Absolute difference of the rate limited pre-throttle pressure and its redundant calculation greater than threshold	0.83 kpa		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Throttle desired torque above desired torque plus threshold	53.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Desired filtered throttle torque exceeds the threshold plus the higher of desired throttle torque or modeled throttle torque	53.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Torque feedback proportional term is out of allowable range or its dual store copy does not match	High Threshold 26.50 Nm Low Threshold -26.50 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Torque feedback integral term magnitude or rate of change is out of allowable range or its dual store copy do not match	High Threshold 49.69 Nm Low Threshold -53.00 Nm Rate of change threshold 3.31 Nm/loop		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Difference of Final Torque feedback proportional plus integral term and its redundant calculation is out of bounds given by threshold range	High Threshold 53.00 Nm Low Threshold -53.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Difference of torque desired throttle area and its redundant calculation is out of bounds given by threshold range	High Threshold 0.50% Low Threshold -0.50%		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Difference of torque model coefficients and its redundant calculation is out of bounds given by threshold range	High Threshold 0.0000270 Low Threshold -0.0000270		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Difference of base friction torque and its redundant calculation is out of bounds given by threshold range	High Threshold 53.00Nm Low Threshold -53.00Nm		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Accessory drive friction torque is out of bounds given by threshold range	High Threshold 53.00 Nm Low Threshold 0.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			AC friction torque is greater than commanded by AC control software or less than threshold limit	High Threshold 39.00 Nm Low Threshold 0.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Difference of Oil temperature delta friction torque and its redundant calculation is out of bounds given by threshold range	High Threshold 53.00 Nm Low Threshold -53.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 2048 ms continuous, 0.5 down time multipier	Not used Series 11
			Generator friction torque is out of bounds given by threshold range	High Threshold 53.00 Nm Low Threshold 0.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Supercharger friction torque is out of bounds given by threshold range	High Threshold 53.00 Nm Low Threshold 0.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Filtered Torque error magnitude or its increase rate of change is out of allowable range or its dual store copy do not match	High Threshold 53.00 Nm Low Threshold -53.00 Nm Rate of change threshold 3.31 Nm/loop		Engine speed >0rpm MAF, MAP and Baro DTCs are false	Up/down timer 475 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Torque error compensation is out of bounds given by threshold range	High Threshold 53.00 Nm Low Threshold 0.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Delta Torque Baro compensation is out of bounds given by threshold range	High Threshold 7.98 Nm Low Threshold -2.72 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			1) Difference of reserve torque value and its redundant calculation exceed threshold 2) Reserve request does not agree with operating conditions or Difference of final predicted torque and its redundant calculation exeed threshold 3) Rate of change of reserve torque exceeds threshold, increasing direction only 4) Reserve engine torque above allowable capacity threshold	1) 52.00 Nm 2) NA 3) 52.00 Nm 4) 52.00 Nm		1&2) Torque reserve (condition when spark control greater than optimum to allow fast transitions for torque disturbances) > 53.00 Nm 3&4) Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			AC friction torque is greater than commanded by AC control software	39.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 2048 ms continuous, 0.5 down time multipier	Not used Series 11

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Absolute difference of the calculated spark offset for equivalence ratio and its redundant calculation greater than threshold	5.52 degrees		Engine speed >0rpm	Up/down timer 150 ms continuous, 0.5 down time multipier	
			Engine Vacuum and its dual store do not match	N/A		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Absolute difference of the calculated Intake Manifold Pressure during engine event versus during time event is greater than threshold	Table, f(Engine Torque). See supporting tables		Engine speed >0rpm	Up/down timer 150 ms continuous, 0.5 down time multipier	
			Min. Axle Torque Capacity is greater than threshold	0.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Predicted torque for zero pedal determination is greater than calc'ed limit.	Table, f(Engine, Oil Temp). See supporting tables + 53.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Commanded Predicted Axle Torque and its dual store do not match	1 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Steady State Estimated Engine Torque and its dual store are not equal	N/A		AFM not changing from Active to Inactive and preload torque not changing and one loop after React command Engine speed >0rpm	Up/down timer 1988 ms continuous, 0.5 down time multipier	
			Difference of Weighting factor for number of cylinders fueled and its redundant calculation is above threshold	0.26		Engine run flag = TRUE > 10.00s	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Difference of minimum spark advance limit and its redundant calculation is out of bounds given by threshold range	5.52 degrees		Ignition in unlock/accessory, run or crank	Up/down timer 150 ms continuous, 0.5 down time multipier	
			Difference of commanded spark advance and adjusted delivered is out of bounds given by threshold range	5.52 degrees		Engine speed >0rpm	Up/down timer 150 ms continuous, 0.5 down time multipier	
			Estimated Engine Torque and its dual store do not match	53.00 Nm		Engine speed >0rpm	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Estimated Engine Torque without reductions due to torque control and its dual store are not match	53.00 Nm		Engine speed >0rpm	Up/down timer 475 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Difference of desired spark advance for managed torque and its redundant calculation is out of bounds given by threshold range	5.52 degrees		Torque reserve (condition when spark control greater than optimum to allow fast transitions for torque disturbances) > 53.00 Nm	Up/down timer 450 ms continuous, 0.5 down time multipier	
			Absolute difference of Engine Capacity Minimum Running Immediate Brake Torque Excluding Cylinder Sensitivity and its redundant calculation is out of bounds given by threshold range	53.00 Nm		Engine speed >0rpm	Up/down timer 175 ms continuous, 0.5 down time multipier	
			One step ahead calculation of air-per-cylinder greater than two step ahead calculation by threshold for time	Threshold: Dynamically calculated based on current engine conditions Fault Pending Threshold: 100 ms		Engine speed > 800rpm	Up/down timer 450 ms continuous, 0.5 down time multipier	
			Rate limited cruise axle torque request and its dual store do not match	97.62 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 163 ms continuous, 0.5 down time multipier	
			1) Absolute difference of Calculated accelerator pedal position compensated for carpet learn and error conditions and its redundant calculation is out of bounds given by threshold range	1) 5.00 % 2) NA 3) NA		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			2) Absolute difference of Calculated accelerator pedal position compensated for carpet learn and error conditions and its dual store do not equal 3) Absolute difference of Calculated accelerator pedal position and its dual store do not equal					
			Commanded axle torque is greater than its redundant calculation by threshold	780.99 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Commanded axle torque is less than its redundant calculation by threshold	-65535.00 Nm		Ignition in unlock/accessory, run or crank Redundant commanded axle torque < --65535.00 Nm	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Commanded engine torque due to fast actuators and its dual store do not equal	NA		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Commanded engine torque due to slow actuators and its dual store do not equal	NA		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Arbitrated Air-Per-Cylinder filter coefficient is out of bounds given by threshold range	High Threshold 1.000 Low Threshold 0.074		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Launch spark is active but the launch spark redundant path indicates it should not be active	NA		Engine speed < 7000.00 or 7200.00 rpm (hysteresis pair)	Up/down timer 150 ms continuous, 0.5 down time multipier	
			Rate limited vehicle speed and its dual store do not equal	NA		Time since first CAN message with vehicle speed >= 0.500sec	10/20 counts; 25.0msec/count	
			transfer case neutral request from four wheel drive logic does not match with operating conditions	NA		Ignition in unlock/accessory, run or crank Transfer case range valid and not over-ridden	32/400 counts; 25.0msec/count	
			transfer case neutral and its dual store do not equal	NA		Ignition in unlock/accessory, run or crank	255/6 counts; 25.0msec/count	
			Throttle progression mode and its dual store do not equal	NA		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			TOS to wheel speed conversion factor is out of bounds given by threshold range	High Threshold 1.10 T/C Range Hi 0.10 T/C Range Lo Low Threshold 1.10 T/C Range Hi 0.10 T/C Range Lo		Ignition in unlock/accessory, run or crank	255/6 counts; 25.0msec/count	
			TOS to wheel speed conversion factor and its dual store do not equal	NA		Ignition in unlock/accessory, run or crank	255/6 counts; 25.0msec/count	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Cylinders active greater than commanded	2 cylinders		Engine run flag = TRUE > 2.00s Number of cylinder events since engine run > 24 No fuel injector faults active	Up/down timer 150 ms continuous, 0.5 down time multipier	
			Absolute difference of Friction torque and its redundant calculation is out of bounds given by threshold range	53.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Absolute difference of Accessory torque and its redundant calculation is out of bounds given by threshold range	53.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Absolute difference of Filtered Air-per-cylinder and its redundant calculation is out of bounds given by threshold range	79.12 mg		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Absolute difference between the previous Final Advance and the current Final Advance not Adjusted for Equivalence Ratio is out of bounds given by threshold range	5.52 degrees		Engine speed >0rpm	Up/down timer 150 ms continuous, 0.5 down time multipier	
			Desired Throttle Area calculated does not equal its redundant calculation	N/A		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Equivance Ratio torque compensation exceeds threshold	-53.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Absolute difference between Equivance Ratio torque compensation and its dual store out of bounds given bt threshold	53.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Commanded Predicted Engine Torque and its dual store do not match	N/A		Ignition in unlock/accessory, run or crank	Up/down timer 2048 ms continuous, 0.5 down time multipier	Not used Series 11
			Zero pedal axle torque is out of bounds given by threshold range	High Threshold 780.99 Nm Low Threshold -65535.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Creep Coast Axle Torque is out of bounds given by threshold range	High Threshold 780.99 Nm Low Threshold -65535.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 2048 ms continuous, 0.5 down time multipier	Not used Series 11
			Torque Learn offset is out of bounds given by threshold range	High Threshold 0.00 Nm Low Threshold 0.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			One step ahead calculation of air-per-cylinder and two step ahead is greater than threshold	80.00 mg		Engine speed >800rpm	Up/down timer 450 ms continuous, 0.5 down time multipier	
			Difference between Unmanaged Spark and PACS Spark is greater than threshold	5.51 degrees		Ignition in unlock/accessory, run or crank	Up/down timer 2048 ms continuous, 0.5 down time multipier	Not used Series 11
			Predicted torque for uncorrected zero pedal determination is greater than calc'ed limit.	Table, f(Engine, Oil Temp). See supporting tables + 53.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Idle speed control calculated predicted minimum torque request exceeds calculated torque limit	Table, f(Engine, Oil Temp). See supporting tables + 53.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Idle speed control calculated predicted minimum torque without reserves exceeds calculated torque limit	Table, f(Engine, Oil Temp). See supporting tables + 53.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Difference between Driver Requested Immediate Torque primary path and its secondary exceeds threshold	780.99 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 2048 ms continuous, 0.5 down time multipier	Not used Series 11

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			PTO Torque Request exceeds allowed rate limited PRO Torque Request	6.81 Nm/25ms		Ignition in unlock/accessory, run or crank	Up/down timer 2048 ms continuous, 0.5 down time multipier	Not used Series 11
			Engine Speed Lores Intake Firing (event based) calculation does not equal its redundant calculation	N/A		Engine speed greater than 0rpm	Up/down timer 150 ms continuous, 0.5 down time multipier	
			Engine Speed Lores Intake Firing timing (event based) calculation does not equal its redundant calculation	N/A		Engine speed greater than 0rpm	Up/down timer 150 ms continuous, 0.5 down time multipier	
			Engine Speed Lores Intake Firing (12.5ms based) calculation does not equal its redundant calculation	N/A		Engine speed greater than 0rpm	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Cold Delta Friction Torque and its dual store do not match	N/A		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			1. Driver Predicted Request is greater than its redundant calculation plus threshold 2. Driver Predicted Request is less than its redundant calculation minus threshold	780.99 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Driver Immediate Request is less than its redundant calculation minus threshold	780.99 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			1. Commanded Immediate Request is greater than its redundant calculation plus threshold 2. Commanded Immediate Request is less than its redundant calculation minus threshold	780.99 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 2048 ms continuous, 0.5 down time multipier	Not used Series 11
			Commanded Immediate Response Type is set to Inactive	N/A		Ignition in unlock/accessory, run or crank	Up/down timer 2048 ms continuous, 0.5 down time multipier	Not used Series 11
			Commanded Immediate Engine Request is greater than its redundant calculation plus threshold	53.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 2048 ms continuous, 0.5 down time multipier	Not used Series 11
			Commanded Predicted Engine Request is greater than its redundant calculation plus threshold	53.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Commanded Hybrid Predicted Crankshaft Request is greater than its redundant calculation plus threshold	4096.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 2048 ms continuous, 0.5 down time multipier	Not used Series 11
			Commanded Hybrid Immediate Crankshaft Request is less than its redundant calculation minus threshold	4096.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 2048 ms continuous, 0.5 down time multipier	Not used Series 11
			Engine Predicted Request Without Motor is greater than its redundant calculation plus threshold	52.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Engine Immediate Request Without Motor is greater than its redundant calculation plus threshold	52.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			1. Positive Torque Offset is greater than its redundant calculation plus threshold 2. Positive Torque Offset is less than its redundant calculation minus threshold	53.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Engine Capacity Minimum Immediate Without Motor is greater than its dual store plus threshold	53.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Engine Capacity Minimum Engine Off is greater than threshold	0 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Engine Capacity Minimum Engine Immediate Without Motor is greater than threshold	0 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 2048 ms continuous, 0.5 down time multipier	Not used Series 11
			Regeneration Brake Assist is not within a specified range	Brake Regen Assist < 0 Nm or Brake Regen Assist > 1000.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 2048 ms continuous, 0.5 down time multipier	Not used Series 11
			Cylinder Spark Delta Correction exceeds the absolute difference as compared to Unadjusted Cylinder Spark Delta	5.51 degrees		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			1. Cylinder Torque Offset exceeds step size threshold 2. Sum of Cylinder Torque Offset exceeds sum threshold	1. 53.00 Nm 2. 53.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Control Module Throttle Actuator Position Performance	P2101	1) Detect a throttle positioning error	Difference between measured throttle position and modeled throttle position >	10.00 percent	TPS minimum learn is not active and Throttle is being Controlled and (Engine Running or Ignition Voltage > or Ignition Voltage >)	Run/crank voltage or Powertrain relay voltage > 6.41 and reduced power is false, else the failure will be reported for all conditions	1. 15 counts; 12.5 ms/count in the primary processor	Trips: 1 Type: A MIL: YES
					11			
			Difference between modeled throttle position and measured throttle position >	10.00 percent	5.5 Ignition voltage failure is false (P1682)			
		2) Detect throttle control is driving the throttle in the incorrect direction or exceed the reduced power limit	Throttle Position >	46.87 percent	TPS minimum learn is active		2. 11 counts; 12.5 ms/count in the primary processor	
			Throttle Position >	45.87 percent	Reduced Power is True			
					Powertrain relay voltage	> 6.41 Volts		
Throttle return to default	P2119	Throttle unable to return to default throttle position after de-energizing ETC motor.	TPS1 Voltage > AND TPS2 Voltage >	1.977 2.087	Throttle de-energized No TPS circuit faults	Run/Crank voltage or Powertrain relay voltage > 6.41 and reduced power is false, else the failure will be reported for all conditions	0.4969 sec	Trips: 1 Type: C MIL: NO
						No 5V reference error or fault for # 4 5V reference circuit (P06A3)		
					PT Relay Voltage >	5.5		
Accelerator Pedal Position (APP) Sensor 1 Lo	P2122	Detect a continuous or intermittent short or open in the APP sensor #1 on Main processor	APP1 Voltage <	0.463		Run/Crank voltage or Powertrain relay voltage > 6.41 and reduced power is false, else the failure will be reported for all conditions	19/39 counts or 14 counts continuous; 12.5 ms/count in the main processor	Trips: 1 Type: A MIL: YES

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						No 5V reference error or fault for # 4 5V reference circuit (P06A3)		
Accelerator Pedal Position (APP) Sensor 1 Hi	P2123	Detect a continuous or intermittent short or open in the APP sensor #1 on Main processor	APP1 Voltage >	4.75		Run/Crank voltage or Powertrain relay voltage > 6.41 and reduced power is false, else the failure will be reported for all conditions No 5V reference error or fault for # 4 5V reference circuit (P06A3)	19/39 counts or 14 counts continuous; 12.5 ms/count in the main processor	Trips: 1 Type: A MIL: YES
Accelerator Pedal Position (APP) Sensor 2 Lo	P2127	Detect a continuous or intermittent short or open in the APP sensor #2 on Main processor	APP2 Voltage <	0.325		Run/Crank voltage or Powertrain relay voltage > 6.41 and reduced power is false, else the failure will be reported for all conditions No 5V reference error or fault for # 4 5V reference circuit (P0697)	19/39 counts or 14 counts continuous; 12.5 ms/count in the main processor	Trips: 1 Type: A MIL: YES
Accelerator Pedal Position (APP) Sensor 2 Hi	P2128	Detect a continuous or intermittent short or open in the APP sensor #2 on Main processor	APP2 Voltage >	2.6		Run/Crank voltage or Powertrain relay voltage > 6.41 and reduced power is false, else the failure will be reported for all conditions No 5V reference error or fault for # 4 5V reference circuit (P0697)	19/39 counts or 14 counts continuous; 12.5 ms/count in the main processor	Trips: 1 Type: A MIL: YES
Throttle Position (TP) Sensor 1-2 Correlation	P2135	1. Detects a continuous or intermittent correlation fault between TPS sensors #1 and #2 on Main processor	1. Difference between TPS1 displaced and TPS2 displaced >	1. 7.022% offset at min. throttle position with a linear threshold to 9.622% at max. throttle position		Run/Crank voltage or Powertrain relay voltage > 6.41 and reduced power is false, else the failure will be reported for all conditions	1 & 2: 79/159 counts or 58 counts continuous; 3.125 ms/count in the main processor	Trips: 1 Type: A MIL: YES

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			2. Difference between (normalized min TPS1) and (normalized min TPS2) >	2. 5.000 % Vref		No TPS sensor faults (P0122, P0123, P0222, P0223) No 5V reference error or fault for # 4 5V reference circuit (P06A3)		
Accelerator Pedal Position (APP) Sensor 1-2 Correlation	P2138	Detects a continuous or intermittent correlation fault between APP sensors #1 and #2 on Main processor	1. Difference between APP1 displaced and APP2 displaced > 2. Difference between (normalized min APP1) and (normalized min APP2) >	1. 5.000% offset at min. pedal position with a linear threshold to 10.000% at max. pedal position 2. 5.000% Vref		Run/Crank voltage or Powertrain relay voltage > 6.41 and reduced power is false, else the failure will be reported for all conditions No APP sensor faults (P2122, P2123,P2127, P2128) No 5V reference errors or faulst for # 3 & # 4 5V reference circuits (P06A3, P0697)	1 & 2: 19/39 counts intermittent or 15 counts continuous, 12.5 ms/count in the main processor	Trips: 1 Type: A MIL: YES
Injector 1 high side circuit shorted to ground	P2147	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the fuel injector high side is shorted to ground		Battery Voltage Engine Run Time	11 ≤ Volts ≤ 32 ≥ 5 Sec P062B not FA or TFTKO	10 failures out of 20 samples 100 ms /sample Continuous	1 trips Type A
Injector 1 high side circuit shorted to power	P2148	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the fuel injector high side is shorted to power		Battery Voltage Engine Run Time	11 ≤ Volts ≤ 32 ≥ 5 Sec P062B not FA or TFTKO	10 failures out of 20 samples 100 ms /sample Continuous	1 trips Type A
Injector 2 high side circuit shorted to ground	P2150	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the fuel injector high side is shorted to ground		Battery Voltage Engine Run Time	11 ≤ Volts ≤ 32 ≥ 5 Sec P062B not FA or TFTKO	10 failures out of 20 samples 100 ms /sample Continuous	1 trips Type A

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Injector 2 high side circuit shorted to power	P2151	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the fuel injector high side is shorted to power		Battery Voltage Engine Run Time	11 ≤ Volts ≤ 32 ≥ 5 Sec P062B not FA or TFTKO	10 failures out of 20 samples 100 ms /sample Continuous	1 trips Type A
Injector 3 high side circuit shorted to ground	P2153	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the fuel injector high side is shorted to ground		Battery Voltage Engine Run Time	11 ≤ Volts ≤ 32 ≥ 5 Sec P062B not FA or TFTKO	10 failures out of 20 samples 100 ms /sample Continuous	1 trips Type A
Injector 3 high side circuit shorted to power	P2154	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the fuel injector high side is shorted to power		Battery Voltage Engine Run Time	11 ≤ Volts ≤ 32 ≥ 5 Sec P062B not FA or TFTKO	10 failures out of 20 samples 100 ms /sample Continuous	1 trips Type A
Injector 4 high side circuit shorted to ground	P2156	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the fuel injector high side is shorted to ground		Battery Voltage Engine Run Time	11 ≤ Volts ≤ 32 ≥ 5 Sec P062B not FA or TFTKO	10 failures out of 20 samples 100 ms /sample Continuous	1 trips Type A
Injector 4 high side circuit shorted to power	P2157	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the fuel injector high side is shorted to power		Battery Voltage Engine Run Time	11 ≤ Volts ≤ 32 ≥ 5 Sec P062B not FA or TFTKO	10 failures out of 20 samples 100 ms /sample Continuous	1 trips Type A
Minimum Throttle Position Not Learned	P2176	TP sensors were not in the minmum learn window after multiple attempts to learn the minimum.	During TPS min learn on the Main processor, TPS Voltage > Number of learn attempts >	0.955 10 counts		Run/crank voltage or Powertrain relay voltage > 6.41 and reduced power is false, else the failure will be reported for all conditions	2.0 secs	Trips: 1 Type: A MIL: YES

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Air Fuel Imbalance Bank 1	P219A	Determines if a cylinder-to-cylinder air-fuel imbalance is present by monitoring the pre and post catalyst O2 sensor voltage characteristics. The pre voltage is used to generate a ratio metric. A normal system will generally result in a negative ratio while a failing system will generally result in a positive ratio. The post voltage is used to generate an X out of Y metric, where Y represents the number of samples and X represents the number of those samples that failed.	**The following criteria apply to:**	**Bank 1**	System Voltage is NOT < for >=	*11.0 Volts* *0.2 seconds*	Minimum of 1 test per trip Maximum of 10 tests per trip The front O2 sensor voltage is sampled once per cylinder event. Therefore, the time required to complete a single test (when all enable conditions are met) decreases as engine speed increases. For example, *9.0* seconds of data is required at 1000 rpm while double this time is required at 500 rpm and half this time is required at 2000 rpm.	1 Trip(s) Type A
			Filtered Ratio	> 2.3	Fuel Level	*10.0 percent AND no fuel level sensor fault*		
					ECT	> -20 degrees C		
			Exclude AFM (DoD) Ratio data from Ratio value	*Yes*	Cumulative engine run time	> 130.0 seconds		
					Engine speed always	< 6500.0 rpm		
			AFM (DoD) operation required in order to report: **AND** AFM (DoD) Filtered Ratio	No > 0.50	Diagnostic runs at Idle regardless of speed, load, air flow, spark advance, and phaser angle:	*No*		
			AND		**Engine speed during:**			
			Post O2 Feature Enabled: **AND** Filtered Post catalyst O2 voltage is NOT between for more than out of during non-AFM	No 651 and 650 mV 62.5 125 seconds	Normal operation	*900 <= rpm <= 6000*		
					Intrusive cam	*1800 <= rpm <= 2400*		
					AFM (DoD)	*1000 <= rpm <= 3000*		
					AFM (DoD) and intrusive cam	*1200 <= rpm <= 2800*		
					Post O2 testing	*1200 <= rpm <= 3100*		
					Engine speed range is less than: during a short term sample	*150 rpm*		
			OR		**Mass Airflow During:**			
			for more than out of during AFM	62.5 125 seconds	Normal operation	*10 <= g/s <= 500*		
					Intrusive cam	*1000000 <= g/s <= 0*		
					AFM (DoD)	*0 <= g/s <= 10000*		
		Monitor Strategy Notes: The AFIM Filtered Ratio is derived from the pre-O2 sensor voltage metric known as Variance. Variance is the statistical variation of the O2 sensor	**NOTE:** The Post O2 Logic is enabled only when operating in an enabled Post O2 Cell. The following Post O2 Cells are enabled:	Decel: *No* Idle: *No* Cruise: *No* Light Accel:	AFM (DoD) and intrusive cam	*0 <= g/s <= 10000*		
					Post O2 testing	*0 <= g/s <= 10000*		
					Cumulative delta mass air flow does not exceed: during a short term sample	*2 g/s*		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		voltage over one engine cycle. The reason we use Variance is because it comprehends O2 signal deviation from nominal on a cylinder firing event basis. This metric is representative of the air/fuel imbalance.		*No*				
				Heavy Accel: *No*	Filtered Mass Airflow does not change by more than: every 12.5 ms Note: first order lag filter coefficient applied to MAF:	*0.25 g/s* *0.150*	The post catalyst O2 sensor voltage is sampled every 12.5 ms. The cumulative time required for the post O2 portion of the diagnostic to report is *125* seconds.	
			NOTE: The "filtered Post catalyst O2 voltage" referred to above is the result of applying a first order lag filter to the Post O2 voltage used by the closed loop fuel control system. The filter coefficient is:	*0.001*	**Air Per Cylinder During:**			
					Normal operation	*250 <= mg/cylinder <= 1200*		
					Intrusive cam	*0 <= mg/cylinder <= 600*		
			Note: Instusive phaser control is active, allowing a specified phaser angle during certain operating conditions:	*No*	AFM (DoD)	*0 <= mg/cylinder <= 700*		
					AFM (DoD) and intrusive cam	*0 <= mg/cylinder <= 600*		
					Post O2 testing	*0 <= mg/cylinder <= 700*	Note: If the post O2 feature is enabled, both the front and post portions of the diagnostic must complete before reporting. If the post O2 feature is not enabled, only the front portion must complete before reporting.	
			The AFIM Filtered Ratio metric is the difference between the current, measured Variance metric and a 17x17 table lookup value (the threshold), divided by a second 17 x 17 table lookup value (the normalizer), and finally multiplied by a Quality Factor, also a 17 x 17 table lookup value (the latter ranges between 0 and 1, based on robustness to false diagnosis in the current operating region). The reason we use a ratio of the Variance is so that we can normalize the failure metric over various	The Quality Factor (QF) calibrations are located in a 17x17 lookup table versus engine speed and load (see Supporting Tables). A QF of "1" is an indication that we were able to achieve at least 4sigma/2sigma robustness in that speed/load region. QF values less than "1" indicate that we don't have 4sigma/2sigma robustness in that region. The quality of the data is	Filtered APC shall not change by more than: between 12.5 ms samples. Note: first order lag filter coefficient applied to APC:	*0.30 percent* *0.100*			
					APC range during short term sample shall not exceed:	*60 mg/cylinder*		
					Spark Advance During:			
					Normal operation	*5 <= degrees <= 55*		
					Intrusive cam	*5 <= degrees <= 55*		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			engine speed and load regions since engine speed and load directly impact the magnitude of the Variance metric.	determined via statistical analysis of Variance data. QF values less than 0.99 identify regions where diagnosis is not possible.	AFM (DoD)	*5 <= degrees <= 55*		
					AFM (DoD) and intrusive cam	*5 <= degrees <= 55*		
					Throttle Area (percent of max) During:			
					Normal operation	*3 <= percent <= 200*		
					Intrusive cam	*0 <= percent <= 200*		
					AFM (DoD)	*0 <= percent <= 200*		
					AFM (DoD) and intrusive cam	*0 <= percent <= 200*		
					Intake Cam Phaser Angle During:			
					Normal operation	*0 <= degrees <= 25*		
					Intrusive cam	*20 <= degrees <= 100*		
					AFM (DoD)	*0 <= degrees <= 100*		
					AFM (DoD) and intrusive cam	*0 <= degrees <= 100*		
					Exhaust Cam Phaser Angle During:			
					Normal operation	*0 <= degrees <= 25*		
					Intrusive cam	*15 <= degrees <= 100*		
					AFM (DoD)	*0 <= degrees <= 100*		
					AFM (DoD) and intrusive cam	*0 <= degrees <= 100*		
					Average O2 voltage change since last sample	< 2 millivolts		
					An AFM (DoD) state change will cause the current sample to be discarded:	*No*		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Quality Factor	>= *0.99 in the current operating region*		
					AIR pump not on			
					CASE learn not active			
					EGR - no device control, no intrusive diagnostics			
					EVAP - no device control, no intrusive diagnostics			
					Engine OverSpeed Protection Not Active			
					Idle speed control normal			
					No EngineMisfireDetected_FA			
					No MAP_SensorFA			
					No MAF_SensorFA			
					No ECT_Sensor_FA			
					No TPS_ThrottleAuthorityDefaulted			
					No FuelInjectorCircuit_FA			
					No AIR System FA			
					No EvapPurgeSolenoidCircuit_FA			
					No EvapFlowDuringNonPurge_FA			
					No EvapVentSolenoidCircuit_FA			
					No EvapSmallLeak_FA			
					No EvapEmissionSystem_FA			
					PTO Not Active			
					Injector base pulse width above min limit			
					Fuel Control Status			
					Closed Loop Long Term FT Enabled	for >= 1.2 seconds **Please see "Closed Loop Enable Criteria" and "Long Term FT Enable Criteria" in Supporting Tables.**		
					Rapid Step Response (RSR):			
					RSR will trigger if the ratio result from the last test is or for AFM (DoD) is **AND** it exceeds the last filtered ratio by at least: or for AFM (DoD) by	 >= 1.5 >= 0.5	For RSR or FIR, *10* tests must complete before the diagnostic can report.	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					at least: Once triggered, the filtered ratio is reset to: or for AFM (DoD) is reset to:	2.0 1.0 0 0		
					Fast Initial Response (FIR):			
					FIR will trigger when an NVM reset or code clear occurs. Once triggered, the non-AFM filtered ratio is reset to: and the AFM filtered ratio is reset to:	0 0		
Barometric Pressure (BARO) Sensor Performance	P2227	Compares baro sensor to the calculated baro estimate (part throttle calculation or unthrottled MAP)	Difference between baro sensor reading and estimated baro when distance since last estimated baro update OR Difference between baro sensor reading and estimated baro	> 15.0 kPa <= 0.06 miles > 20.0 kPa	No Active DTCs: Engine Run Time	AmbientAirPressCktFA ECT_Sensor_Ckt_FA IAT_SensorFA MAF_SensorFA AfterThrottlePressureFA TPS_FA TPS_Performance_FA VehicleSpeedSensor_FA > 0.00 seconds	320 failures out of 400 samples 1 sample every 12.5 msec	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			when distance since last estimated baro update	> 0.06 miles				
			<u>Engine Not Rotating Case:</u>					
			Barometric Pressure OR	< 50.0 kPa	Time between current ignition cycle and the last time the engine was running		4 failures out of 5 samples	
			Barometric Pressure	> 115.0 kPa		> 10.0 seconds	1 sample every 12.5 msec	
					Engine is not rotating			
					No Active DTCs:	EngModeNotRunTmErr MAP_SensorFA AAP_SnsrFA SCIAP_SensorFA AAP2_SnsrFA		
					No Pending DTCs:	MAP_SensorCircuitFP AAP_SnsrCktFP SCIAP_SensorCircuitFP AAP2_SnsrCktFP		
Barometric Pressure (BARO) Sensor Circuit Low	P2228	Detects a continuous short to low or open in either the signal circuit or the BARO sensor.	BARO Voltage	< 34.5 % of 5 Volt Range (1.7 Volts = 43.9 kPa)	Engine Run Time	> 0.00 seconds	320 failures out of 400 samples 1 sample every 12.5 msec	Type B 2 trips
Barometric Pressure (BARO) Sensor Circuit High	P2229	Detects an open sensor ground or continuous short to high in either the signal circuit or the BARO sensor.	BARO Voltage	> 90.0 % of 5 Volt Range (4.5 Volts = 115.0 kPa)	Engine Run Time	> 0.00 seconds	320 failures out of 400 samples 1 sample every 12.5 msec	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Barometric Pressure (BARO) Sensor Circuit Intermittent	P2230	Detects a noisy or erratic barometric pressure input	Difference between the current Baro sensor reading and the previous Baro sensor reading	> 10.0 kPa	Vehicle Speed No Active DTCs:	< 512 KPH AmbientAirPressCktFA ECT_Sensor_FA IAT_SensorFA MAF_SensorFA AfterThrottlePressure_NA TPS_FA TPS_Performance_FA VehicleSpeedSensorError	320 failures out of 400 samples 1 sample every 12.5 msec	Type B 2 trips
Turbo/Super Charger Bypass Valve - Mechanical	P2261	Detect Stuck Closed Bypass Valve	Between start and end time is high pass filtered accumulated Air mass Flow or Boost Pressure larger then Thresholds Filter Frequancy Filtered Air Mass Flow Filtered Boost Pressure	0.25 Second < Accmulation time < 1.00 Second 10.00 Hz > 40.000 g/s > 40.00 kPa	Diagnosis Enabled Engine Speed Pressure ratio over the compressor Relative Boost Pressure (Boost - Ambient) and Negative Transient in Manifold Air Pressure Bypass Valve Commanded Opened No Active DTCs:	Enabled >= 1500 rpm > KtBSTD_r_ExcsvBstPresLim Enable condition kept true for 0.8 seconds extra See Tables in Supporting Tables Sheet IF (RelativeBoost < 0.0 kPa OR DerivativeMAP > 10.00 kPa/s) [FALSE] Else (RelativeBoost >= 25.0 kPa AND DerivativeMAP <= -150.00 kPa) [TRUE] > 6.0 percent Enable condition kept true for 0.50 seconds extra TC_BoostPresSnsrFA MAF_SensorFA BSTR_b_TurboBypassCktFA	7 Failed tests out of 10 Tests 1 sample every 25ms	Type B 2 trips
Fuel Conductivity Out Of Range (water in fuel)	P2269	Detects Sensor Frequency Signal	Flex Fuel Sensor Output Frequency	> 185 Hertz	Powertrain Relay	> 11.0 Volts < 32.0 Volts	50 failures out of 63 samples 100 ms loop Continuous	2 trip(s) Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
O2 Sensor Signal Stuck Lean Bank 1 Sensor 2	P2270	This DTC determines if the post catalyst O2 sensor is stuck in a normal lean voltage range and thereby can no longer be used for post oxygen sensor fuel control or for catalyst monitoring. The diagnostic is an intrusive test (during coast) which increases the delivered fuel to achieve the required rich threshold.	Post O2 sensor signal AND The Accumulated mass air flow monitored during the Stuck Lean Voltage Test	< 825 mvolts > 66 grams	No Active DTC's B1S2 Failed this key cycle System Voltage ICAT MAT Burnoff delay Green O2S Condition Low Fuel Condition Diag Engine Speed to initially enable test Engine Speed range to keep test enabled (after initially enabled) Engine Airflow Vehicle Speed to initially enable test Vehicle Speed range to keep test enabled (after initially enabled) Closed loop integral Closed Loop Active Evap Ethanol Post fuel cell EGR Intrusive diagnostic	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA P013A, P013B, P013E, P013F, P2270 or P2271 10.0 < Volts < 32.0 = Not Valid = Not Valid, See definition of **Green Sensor Delay Criteria (B1S2)** in Supporting Tables tab. = False 1175 ≤ RPM ≤ 2200 1100 ≤ RPM ≤ 2300 2 ≤ gps ≤ 10 40.4 ≤ MPH ≤ 74.6 35.4 ≤ MPH ≤ 82.0 mph 0.80 ≤ C/L Int ≤ 1.07 = TRUE not in control of purge not in estimate mode = enabled = not active	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed.	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					All post sensor heater delays	= not active		
					O2S Heater on Time	≥ 180.0 sec		
					Predicted Catalyst temp	500 ≤ ºC ≤ 900		
					Fuel State	= DFCO possible		
					All of the above met for at least 3.0 seconds, and then the Force Cat Rich intrusive stage is requested.			
O2 Sensor Signal Stuck Rich Bank 1 Sensor 2	P2271	This DTC determines if the post catalyst O2 sensor is stuck in a normal rich voltage range and thereby can no longer be used for post oxygen sensor fuel control or for catalyst monitoring. The diagnostic is an intrusive test which requests the DFCO mode to achieve the required lean threshold.	Post O2 sensor signal AND The Accumulated mass air flow monitored during the Stuck Rich Voltage Test	> 100 mvolts > 31 grams	No Active DTC's	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed.	2 trips Type B
					B1S2 Failed this key cycle	P013A, P013B, P013E, P013F or P2270		
					System Voltage	10.0 < Volts < 32.0		
					ICAT MAT Burnoff delay	= Not Valid		
					Green O2S Condition	= Not Valid, See definition of **Green Sensor Delay Criteria (B1S2)** in Supporting Tables tab.		
					Low Fuel Condition Diag	= False		
					Engine Speed	1175 ≤ RPM ≤ 2200		
					Engine Airflow	2 ≤ gps ≤ 10		
					Vehicle Speed	40.4 ≤ MPH ≤ 74.6		
					Closed loop integral	0.80 ≤ C/L Int ≤ 1.07		
					Closed Loop Active	= TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Evap	not in control of purge
					Ethanol	not in estimate mode
					Post fuel cell	= enabled
					Power Take Off	= not active
					EGR Intrusive diagnostic	= not active
					All post sensor heater delays	= not active
					O2S Heater on Time	≥ 180.0 sec
					Predicted Catalyst temp	500 ≤ ºC ≤ 900
					Fuel State	= DFCO possible
					DTC's Passed	= P2270 (and P2272 if applicable)
					DTC's Passed	= P013E (and P014A if applicable)
					DTC's Passed	= P013A (and P013C if applicable)
					After above conditions are met: DFCO mode is continued (wo driver initiated pedal input).			
SIDI High Pressure Pump	P228C	Detects measured fuel rail pressure bias too low from desired fuel pressure.	Desired Pressure - Measure Pressure	≥ 3.00 Mpa	Battery Voltage	11 <= Volts <= 32	Pressure Error - 750 failures out of 938 samples	1 trips Type A
					Low Side Fuel Pressure	> 0.250 MPa		
					Engine Run Time	>= KtFHPD_t_PumpCntrlEngRunThrsh (see supporting tables) Enabled when a code clear is not active or not exiting device control Engine is not cranking		
					Additional Enable Conditions:			
						High Pressure Pump is enabled		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						Estimate fuel rail pressure is valid Green Engine (In assembly plant) is not enabled Not LowFuelConditionDiagnostic Low side Fuel Pump is on Injector Flow Test is not active Device control commanded pressure is false Device control pump ckt enabled on is false Engine movement detected is true (Function of crankshaft and camshaft position) Manufacturers enable counter is 0		
					Barometric Pressure Inlet Air Temp Fuel Temp	 >= 70.0 >= -10.0 -10 ≤ Temp degC ≤ 100		
					DTCs not Active:	FHPR_b_FRP_SnsrCkt_FA FHPR_b_FRP_SnsrCkt_TFTKO FHPR_b_PumpCkt_FA FHPR_b_PumpCkt_TFTKO CrankSensorFA CamSensorFA IAT_SensorFA IAT2_SensorFA ECT_Sensor_FA FHPR_b_PumpCkt_FA Ethanol Composition Sensor FA PowertrainRelayFault		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
SIDI High Pressure Pump	P228D	Detects measured fuel rail pressure bias too high from desired fuel pressure	Desired Pressure - Measure Pressure	≤ -3.00 Mpa	Battery Voltage	11 <= Volts <= 32	Pressure Error - 750 failures out of 938 samples	1 trips Type A
					Low Side Fuel Pressure	> 0.250 MPa		
					Engine Run Time	>= KtFHPD_t_PumpCntrlEngRunThrsh (see supporting tables) Enabled when a code clear is not active or not exiting device control Engine is not cranking		
					Additional Enable Conditions:			
						High Pressure Pump is enabled Estimate fuel rail pressure is valid Green Engine (In assembly plant) is not enabled Not LowFuelConditionDiagnostic Low side Fuel Pump is on Injector Flow Test is not active Device control commanded pressure is false Device control pump ckt enabled on is false Engine movement detected is true (Function of crankshaft and camshaft position) Manufacturers enable counter is 0		
					Barometric Pressure			
					Inlet Air Temp	>= 70.0		
					Fuel Temp	>= -10.0 -10 ≤ Temp degC ≤ 100		
					DTCs not Active:	FHPR_b_FRP_SnsrCkt_FA FHPR_b_FRP_SnsrCkt_TFTKO FHPR_b_PumpCkt_FA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						FHPR_b_PumpCkt_TFTKO CrankSensorFA CamSensorFA IAT_SensorFA IAT2_SensorFA ECT_Sensor_FA FHPR_b_PumpCkt_FA Ethanol Composition Sensor FA PowertrainRelayFault		
Transmission Control Torque Request Circuit	P2544	Determines if the torque request from the TCM is valid	**Protect error** - Serial Communication message - ($199 - PTEI3)	Message <> two's complement of message	Diagnostic enabled/ disabled	Enabled	>= 16 Protect errors during key cycle. Performed every 12.5 msec	2 trip(s)
			OR					
			Rolling count error - Serial Communication message ($199 - PPEI3) rolling count value	Message <> previous message rolling count value + one	Power Mode	= Run	>= 6 Rolling count errors out of ten samples. Performed every 12.5 msec	Type B
			OR					
			RAM error - Serial Communication message ($199 - PPEI3)	Transmission torque request value or request type dual store not equal	Engine Running Run/Crank Active	= True > 0.50 Sec	>= 3 RAM errors out of 6 samples. Performed every 12.5 msec	
			OR					
			Range Error - Serial Communication message - ($199 - PTEI3) TCM Requested Torque Increase	> 337 Nm			>= 3 out of 10 samples. Performed every 12.5 msec	
			OR					
			Multi-transition error -				>= 3 multi-	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Trans torque intervention type request change	Requested torque intervention type toggles from not increasing request to increasing request			transitions out of 5 samples. Performed every 200 msec	
ECM/PCM Internal Engine Off Timer Performance	P2610	This DTC determines if the engine mode not running timer does not initialize or count properly. There are two tests to ensure proper functioning of the timer: Count Up Test (CUT) and Range Test (RaTe). Count Up Test (CUT): Verifies that the HWIO timer is counting up with the proper increment. Range Test (RaTe): Runs a mirror timer to the HWIO timer. The mirror timer is started when the Engine Mode Not Run Timer is started. When the engine starts or when	**Count Up Test:** Time difference between the current read and the previous read of the Timer **Range Test:** The variation of the HWIO timer and mirror timer is at controller shutdown.	> 1.50 seconds > 25 %	IAT Temperature No active DTCs: **Count Up Test:** Ignition key off OR Engine off **Range Test:** ECM is powering down	-256 °C ≤ Temperature ≤ 256 °C IAT_SensorFA	**Count Up Test:** 8 failures out of 40 samples 1 sec / sample Continuous from key off or engine off until controller shutdown. **Range Test:** One time when the controller is powered down.	2 trips Type B DTC sets on next key cycle if failure detected.

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		a controller shutdown is requested, the HWIO timer and mirror timer are compared.						
O2Sensor Circuit Range/ Performance Bank 1 Sensor 1	P2A00	This DTC determines if the O2 sensor voltage is not meeting the voltage criteria to enable closed loop fueling.	Closed Loop O2S ready flag	= False	No Active DTC's	TPS_ThrottleAuthorityDefaulted MAP_SensorFA ECT_Sensor_FA FuelInjectorCircuit_FA P0131, P0151 P0132, P0152	200 failures out of 250 samples. Frequency: Continuous 100msec loop	2 trips Type B
			A) O2S signal must be	< 1100 mvolts				
			To set Closed Loop ready flag	= True				
			Closed Loop O2S ready flag	= True	System Voltage	10.0 < Volts < 32.0		
					Engine Speed	700 ≤ RPM ≤ 3000		
			B) Once set to ready O2S cannot be	> 1100 mvolts	Engine Airflow	3.0 ≤ gps ≤ 45.0		
			for	> 5.0 seconds	Engine Coolant	≥ 70.0 ºC		
					Engine Metal Overtemp Active	= False		
			Then set Closed Loop ready flag	= False	Converter Overtemp Active	= False		
					Fuel State	DFCO not active		
					AFM Status	= All Cylinders active		
					Predicted Exhaust Temp (B1S1)	≥ 0.0 ºC		
					Engine run time	> 100 seconds		
					Fuel Enrichment	= Not Active		
					<u>All of the above met for</u>	> 5 seconds		
Control Module Communication Bus A Off	U0073	This DTC monitors for a BUS A off condition	Bus off failures	≥ 5 counts	CAN hardware is bus OFF for	> 0.5000 seconds	Diagnostic runs in 12.5 ms loop	2 Trip(s)
			out of these samples	≥ 5 counts	Diagnostic enable timer	> 3.0000 seconds		Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Lost Communication With TCM	U0101	This DTC monitors for a loss of communication with the transmission control module	Message is not received from controller for this amount of time.	Type B time = 10s Type C time = 12s Torque Security Ucode = varied and possibly much shorter time.	Run/Crank Voltage	11 volts ≤ Voltage ≤ 32 volts	The fail diagnostic runs in the 6.25 ms loop with pass conditions reported to the DFIR in the 1000ms loop.	2 Trip(s)
					Power mode is RUN			Type B
					Communication bus is not OFF			
					or is typed as a C code			
					Normal Communication is enabled			
					Normal Transmit capability is TRUE			
					The diagnostic system is not disabled			
					The bus has been on for	> 3.0000 seconds		
					A message has been selected to monitor.			
Lost Communication With Fuel Pump Control Module	U0109	This DTC monitors for a loss of communication with the fuel pump control module	Message is not received from controller for this amount of time.	Type B time = 10s Type C time = 12s Torque Security Ucode = varied and possibly much shorter time.	Run/Crank Voltage	11 volts ≤ Voltage ≤ 32 volts	The fail diagnostic runs in the 6.25 ms loop with pass conditions reported to the DFIR in the 1000ms loop.	2 Trip(s)
					Power mode is RUN			Type B
					Communication bus is not OFF			
					or is typed as a C code			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Normal Communication is enabled			
					Normal Transmit capability is TRUE			
					The diagnostic system is not disabled			
					The bus has been on for	> 3.0000 seconds		
					A message has been selected to monitor.			
Lost Communication With Body Control Module	U0140	This DTC monitors for a loss of communication with the Body Control Module.	Message is not received from controller for this amount of time.	Type B time = 10s Type C time = 12s Torque Security Ucode = varied and possibly much shorter time.	Run/Crank Voltage	11 volts ≤ Voltage ≤ 32 volts	The fail diagnostic runs in the 6.25 ms loop with pass conditions reported to the DFIR in the 1000ms loop.	1 Trip(s)
					Power mode is RUN			Type C
					Communication bus is not OFF			
					or is typed as a C code			
					Normal Communication is enabled			
					Normal Transmit capability is TRUE			
					The diagnostic system is not disabled			
					The bus has been on for	> 3.0000 seconds		
					A message has been selected to monitor.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Lost Communication With Anti-Lock Brake System (ABS) Control Module	U0121	This DTC monitors for a loss of communication with the ABS control module.	Message is not received from controller for this amount of time.	Type B time = 10s Type C time = 12s Torque Security Ucode = varied and possibly much shorter time.	Run/Crank Voltage	11 volts ≤ Voltage ≤ 32 volts	The fail diagnostic runs in the 6.25 ms loop with pass conditions reported to the DFIR in the 1000ms loop.	1 Trip(s)
					Power mode is RUN			Type C
					Communication bus is not OFF			
					or is typed as a C code			
					Normal Communication is enabled			
					Normal Transmit capability is TRUE			
					The diagnostic system is not disabled			
					The bus has been on for	> 3.0000 seconds		
					A message has been selected to monitor.			

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Supporting Tables

P0011
KtPHSD_phi_CamPosErrorLimIc1

X axis is Deg C
Y axis is RPM

	-40.0000	-28.0000	-16.0000	-4.0000	8.0000	20.0000	32.0000	44.0000	56.0000	68.0000	80.0000	92.0000	104.0000	116.0000	128.0000	140.0000	152.0000
400	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
800	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
1200	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
1600	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
2000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
2400	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
2800	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
3200	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
3600	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
4000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
4400	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
4800	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
5200	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
5600	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
6000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
6400	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
6800	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000

P0014
KtPHSD_phi_CamPosErrorLimEc1

X axis is Deg C
Y axis is RPM

	-40.0000	-28.0000	-16.0000	-4.0000	8.0000	20.0000	32.0000	44.0000	56.0000	68.0000	80.0000	92.0000	104.0000	116.0000	128.0000	140.0000	152.0000
400	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
800	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
1200	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
1600	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
2000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
2400	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
2800	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
3200	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
3600	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
4000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
4400	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
4800	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
5200	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
5600	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
6000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
6400	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
6800	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000

P0011
KtPHSD_t_StablePositionTimeIc1

X axis is Deg C
Y axis is RPM

	-40.0000	-28.0000	-16.0000	-4.0000	8.0000	20.0000	32.0000	44.0000	56.0000	68.0000	80.0000	92.0000	104.0000	116.0000	128.0000	140.0000	152.0000
400	20.000	20.000	20.000	12.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
800	20.000	20.000	20.000	12.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
1200	20.000	20.000	20.000	12.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
1600	20.000	20.000	20.000	12.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
2000	20.000	20.000	20.000	12.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
2400	20.000	20.000	20.000	12.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
2800	20.000	20.000	20.000	12.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
3200	20.000	20.000	20.000	12.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
3600	20.000	20.000	20.000	12.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
4000	20.000	20.000	20.000	12.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
4400	20.000	20.000	20.000	12.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
4800	20.000	20.000	20.000	12.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
5200	20.000	20.000	20.000	12.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
5600	20.000	20.000	20.000	12.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
6000	20.000	20.000	20.000	12.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
6400	20.000	20.000	20.000	12.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
6800	20.000	20.000	20.000	12.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000

12 OBDGS2 Engine Diagnostics

Supporting Tables

P0014
KtPHSD_t_StablePositionTimeEc1

X axis is Deg C
Y axis is RPM

	-40.0000	-28.0000	-16.0000	-4.0000	8.0000	20.0000	32.0000	44.0000	56.0000	68.0000	80.0000	92.0000	104.0000	116.0000	128.0000	140.0000	152.0000
400	20.000	20.000	20.000	12.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
800	20.000	20.000	20.000	12.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
1200	20.000	20.000	20.000	12.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
1600	20.000	20.000	20.000	12.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
2000	20.000	20.000	20.000	12.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
2400	20.000	20.000	20.000	12.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
2800	20.000	20.000	20.000	12.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
3200	20.000	20.000	20.000	12.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
3600	20.000	20.000	20.000	12.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
4000	20.000	20.000	20.000	12.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
4400	20.000	20.000	20.000	12.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
4800	20.000	20.000	20.000	12.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
5200	20.000	20.000	20.000	12.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
5600	20.000	20.000	20.000	12.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
6000	20.000	20.000	20.000	12.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
6400	20.000	20.000	20.000	12.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
6800	20.000	20.000	20.000	12.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000

P0420, P0430

MinimumEngineRunTime

Coolant Temp	40	50	60	70	80
Engine Run Time	120	120	120	120	120

MinAirflowToWarmCatalyst

Engine Coolant	0	45	90
MinAirFlowToWrmCat	30	17	4

P0300-P0308: Idle SCD

(decel index (> Idle SCD AND > Idle SCD ddt Tables))

load
Load

	400	500	600	650	700	800	900	1000	1100	1200	1400	1600	1800
10	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
12	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
15	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
18	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
22	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
26	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
31	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
35	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
38	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
42	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
45	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
50	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
54	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
60	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
65	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
71	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
77	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767

12 OBDGS2 Engine Diagnostics

Supporting Tables

P0300-P0308: Idle SCD ddt

load	400	500	600	650	700	800	900	1000	1100	1200	1400	1600	1800
10	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
12	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
15	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
18	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
22	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
26	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
31	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
35	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
38	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
42	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
45	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
50	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
54	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
60	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
65	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
71	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
77	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767

P0300-P0308: SCD Delta

OR (decel index >SCD Delta **AND** > SCD Delta ddt Tables))

load Load	400	500	600	700	800	900	1000	1100	1200	1400	1600	1800	2000
9	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
10	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
12	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
15	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
18	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
22	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
26	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
31	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
38	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
45	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
54	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
65	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
77	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
91	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
107	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
135	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
177	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767

P0300-P0308: SCD Delta ddt

load	400	500	600	700	800	900	1000	1100	1200	1400	1600	1800	2000
9	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
10	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
12	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
15	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
18	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
22	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
26	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
31	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
38	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
45	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
54	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
65	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
77	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
91	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
107	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
135	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
177	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767

12 OBDGS2 Engine Diagnostics

Supporting Tables

P0300-P0308: Idle Cyl Mode **OR** (decel index (>Idle Cyl Mode **AND** > Idle Cyl Mode ddt Tables))

		400	500	600	650	700	800	900	1000	1100	1200	1400	1600	1800
load	**10**	3500	3250	3000	2550	2100	1700	1200	900	650	500	300	275	225
Load	**12**	3250	3000	2750	2375	2000	1600	1050	700	550	450	275	250	200
	15	3100	2800	2500	2150	1800	1500	1000	750	600	500	260	250	175
	18	3000	2600	2200	2000	1800	1450	1000	800	650	500	250	200	150
	22	4000	3200	2400	2150	1900	1500	1000	850	650	500	300	225	160
	26	4200	3400	2600	2300	2000	1500	1000	900	700	500	300	250	175
	31	4400	3600	2800	2500	2200	1500	1300	1000	750	550	350	300	200
	35	4500	3700	2900	2600	2300	1625	1475	1200	875	600	425	350	225
	38	4600	3800	3000	2700	2400	1750	1650	1400	1000	600	450	400	250
	42	4700	3900	3100	2838	2575	1875	1775	1500	1100	600	475	425	275
	45	4800	4000	3200	2975	2750	2000	1900	1600	1200	700	500	450	300
	50	4900	4100	3300	3088	2875	2125	2025	1700	1300	800	525	475	325
	54	5000	4200	3400	3200	3000	2250	2150	1800	1400	900	550	500	350
	60	5100	4300	3500	3313	3125	2375	2275	1900	1500	1000	575	525	375
	65	5200	4400	3600	3425	3250	2500	2400	2000	1600	1100	600	550	400
	71	5300	4500	3700	3538	3375	2625	2500	2100	1700	1200	750	650	450
	77	5400	4600	3800	3650	3500	2750	2600	2200	1800	1300	900	750	500

P0300-P0308: Idle Cyl Mode ddt

		400	500	600	650	700	800	900	1000	1100	1200	1400	1600	1800
load	**10**	3500	3250	3000	2550	2100	1900	1400	900	750	500	300	275	225
	12	3250	3000	2750	2375	2000	1800	1200	800	650	450	275	250	200
	15	3100	2800	2500	2150	1800	1700	1250	900	700	500	250	250	175
	18	3000	2600	2200	2000	1800	1600	1400	1000	800	550	250	200	150
	22	3200	2800	2400	2150	1900	1600	1500	1200	900	600	300	275	200
	26	3400	3000	2600	2300	2000	1600	1600	1400	1000	600	400	300	250
	31	3700	3250	2800	2500	2200	1800	1700	1500	1000	600	450	350	300
	35	3850	3375	2900	2600	2300	2025	1950	1550	1100	600	500	400	325
	38	4000	3500	3000	2700	2400	2250	2200	1600	1200	600	500	425	350
	42	4150	3625	3100	2838	2575	2375	2225	1700	1300	600	500	450	375
	45	4300	3750	3200	2975	2750	2500	2250	1800	1400	700	500	475	400
	50	4450	3875	3300	3088	2875	2625	2375	1900	1500	800	525	500	425
	54	4600	4000	3400	3200	3000	2750	2500	2000	1600	900	550	525	450
	60	4750	4125	3500	3313	3125	2875	2650	2100	1700	1000	575	550	475
	65	4900	4250	3600	3425	3250	3000	2800	2200	1800	1100	600	575	500
	71	5050	4375	3700	3538	3375	3125	2900	2300	1900	1250	750	650	575
	77	5200	4500	3800	3650	3500	3250	3000	2400	2000	1500	900	800	650

12 OBDGS2 Engine Diagnostics

Supporting Tables

P0300-P0308: Cyl Mode **OR** (decel index > Cyl Mode AND > Cyl Mode ddt Tables))

load
Load

	400	500	600	700	800	900	1000	1100	1200	1400	1600	1800	2000	2200	2400	2600
9	3750	3500	3250	2200	1800	1400	1000	750	550	350	300	275	160	120	130	95
10	3500	3250	3000	2100	1700	1200	900	650	500	300	275	225	150	115	120	85
12	3250	3000	2750	2000	1600	1050	700	550	450	275	250	200	135	110	90	80
15	3100	2800	2500	1800	1500	1000	750	600	500	260	250	175	130	100	80	80
18	3000	2600	2200	1800	1450	1000	800	650	500	250	200	150	115	90	85	75
22	4000	3200	2400	1900	1500	1000	850	650	500	300	225	160	125	80	70	50
26	4200	3400	2600	2000	1500	1000	900	700	500	300	250	175	125	90	70	55
31	4400	3600	2800	2200	1500	1300	1000	750	550	350	300	200	150	110	80	60
38	4600	3800	3000	2400	1750	1650	1400	1000	750	500	400	250	175	120	100	70
45	4800	4000	3200	2750	2000	1900	1600	1200	1000	600	450	300	250	175	150	125
54	5000	4200	3400	3000	2250	2150	1800	1400	1100	700	550	400	350	250	200	150
65	5200	4400	3600	3250	2500	2400	2000	1600	1200	800	650	500	400	300	250	175
77	5400	4600	3800	3500	2750	2600	2200	1800	1300	900	750	600	450	400	300	225
91	5600	4800	4000	3750	3000	2800	2400	1850	1400	1000	850	600	500	450	350	300
107	5750	5000	4250	4000	3250	3000	2600	1900	1500	1100	950	700	600	550	450	350
135	5900	5200	4500	4250	3500	3250	2800	1950	1600	1200	1000	800	700	650	550	400
177	6050	5400	4750	4500	3750	3500	3000	2000	1750	1300	1050	900	800	750	650	450

	2800	3000	3500	4000	4500	5000	5500	6000	6500	7000
9	85	75	60	45	45	35	25	22	22	22
10	70	65	55	40	40	30	22	20	20	20
12	65	50	50	35	35	27	20	19	19	19
15	60	45	45	30	30	24	18	18	18	18
18	60	45	35	27	25	22	17	17	17	17
22	45	40	30	25	22	18	16	16	16	16
26	50	40	30	23	22	18	15	15	15	15
31	50	40	40	25	22	20	15	14	14	14
38	55	40	45	32	22	20	16	15	15	15
45	80	70	60	35	25	21	17	16	16	16
54	120	90	65	48	32	25	18	18	18	18
65	150	120	75	55	38	30	23	20	20	20
77	200	150	100	65	45	37	29	25	25	25
91	250	175	125	80	55	45	36	30	30	30
107	300	200	150	90	65	50	40	35	35	35
135	350	250	200	110	85	60	50	45	45	45
177	400	275	225	125	100	70	65	55	55	55

12 OBDGS2 Engine Diagnostics

Supporting Tables

P0300-P0308: Cyl Mode ddt

load

	400	500	600	700	800	900	1000	1100	1200	1400	1600	1800	2000	2200	2400	2600
9	3750	3500	3250	2200	2000	1600	1000	850	550	350	300	275	160	130	130	95
10	3500	3250	3000	2100	1900	1400	900	750	500	300	275	225	150	120	120	90
12	3250	3000	2750	2000	1800	1200	800	650	450	275	250	200	145	110	100	90
15	3100	2800	2500	1800	1700	1250	900	700	500	250	250	175	140	105	95	90
18	3000	2600	2200	1800	1600	1400	1000	900	550	300	200	150	125	100	90	80
22	3200	2800	2400	1900	1600	1500	1200	1100	600	400	300	200	150	120	100	70
26	3400	3000	2600	2000	1600	1600	1400	1200	750	500	350	250	200	160	120	75
31	3700	3250	2800	2200	1800	1700	1500	1250	800	600	450	300	250	200	150	90
38	4000	3500	3000	2400	2250	2200	1600	1300	1000	800	550	350	325	250	200	125
45	4300	3750	3200	2750	2500	2250	1800	1400	1200	1000	650	500	400	300	250	175
54	4600	4000	3400	3000	2750	2500	2000	1600	1300	1200	900	700	500	400	300	225
65	4900	4250	3600	3250	3000	2800	2200	1800	1600	1400	1200	900	600	500	400	300
77	5200	4500	3800	3500	3250	3000	2400	2000	1800	1600	1400	1100	700	600	500	300
91	5500	4750	4000	3750	3500	3200	2600	2050	1900	1800	1600	1200	800	700	600	400
107	5750	5000	4250	4000	3750	3400	2800	2100	2000	1900	1700	1300	900	800	700	500
135	6000	5250	4500	4250	4000	3600	3000	2200	2100	2000	1800	1400	1000	900	800	600
177	6250	5500	4750	4500	4250	3800	3200	2250	2200	2100	1900	1500	1100	1000	900	700

	2800	3000	3500	4000	4500	5000	5500	6000	6500	7000
9	90	75	65	55	50	40	35	30	30	30
10	80	65	60	50	45	35	30	25	25	25
12	75	55	55	40	40	30	25	22	22	22
15	70	55	50	35	35	30	22	20	20	20
18	70	55	45	30	30	25	20	18	18	18
22	60	50	40	30	25	22	18	17	17	17
26	65	50	45	30	25	22	17	16	16	16
31	75	50	45	32	28	24	16	15	15	15
38	95	70	45	35	32	28	22	18	17	17
45	125	100	50	40	33	30	26	22	20	20
54	150	120	75	50	38	35	32	27	25	25
65	200	135	110	70	50	43	37	30	30	30
77	225	175	135	95	65	53	45	35	35	35
91	300	225	175	120	80	65	50	40	40	40
107	400	275	225	160	100	80	65	55	50	50
135	500	350	275	200	150	90	80	70	65	65
177	600	400	300	250	200	100	90	80	75	75

12 OBDGS2 Engine Diagnostics

Supporting Tables

P0300-P0308: Rev Mode Table **OR** (decel index > Rev Mode Table)

load

	1100	1200	1400	1600	1800	2000	2200	2400	2600	2800	3000	3500	4000	4500
9	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
10	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
12	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
15	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
18	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
22	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
26	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
31	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
38	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
45	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
54	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
65	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
77	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
91	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
107	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
135	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
177	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767

	5000	5500	6000	6500	7000
9	32767	32767	32767	32767	32767
10	32767	32767	32767	32767	32767
12	32767	32767	32767	32767	32767
15	32767	32767	32767	32767	32767
18	32767	32767	32767	32767	32767
22	32767	32767	32767	32767	32767
26	32767	32767	32767	32767	32767
31	32767	32767	32767	32767	32767
38	32767	32767	32767	32767	32767
45	32767	32767	32767	32767	32767
54	32767	32767	32767	32767	32767
65	32767	32767	32767	32767	32767
77	32767	32767	32767	32767	32767
91	32767	32767	32767	32767	32767
107	32767	32767	32767	32767	32767
135	32767	32767	32767	32767	32767
177	32767	32767	32767	32767	32767

12 OBDGS2 Engine Diagnostics

Supporting Tables

P0300-P0308: AFM Mode Table

OR (decel index > AFM Table if active fuel management)

load
Load

	400	500	600	700	800	900	1000	1100	1200	1400	1600	1800	2000	2200
0	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
6	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
13	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
19	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
25	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
31	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
38	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
44	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
50	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
56	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
63	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
69	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
75	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
81	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
88	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
94	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
100	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767

	2400	2600	2800	3000	3500
0	32767	32767	32767	32767	32767
6	32767	32767	32767	32767	32767
13	32767	32767	32767	32767	32767
19	32767	32767	32767	32767	32767
25	32767	32767	32767	32767	32767
31	32767	32767	32767	32767	32767
38	32767	32767	32767	32767	32767
44	32767	32767	32767	32767	32767
50	32767	32767	32767	32767	32767
56	32767	32767	32767	32767	32767
63	32767	32767	32767	32767	32767
69	32767	32767	32767	32767	32767
75	32767	32767	32767	32767	32767
81	32767	32767	32767	32767	32767
88	32767	32767	32767	32767	32767
94	32767	32767	32767	32767	32767
100	32767	32767	32767	32767	32767

P0300-P0308: Zero torque engine load

Zero Torque: All Cylinders active

RPM	Pct load
400	14.00
500	13.00
600	12.30
700	11.50
800	11.00
900	10.60
1000	10.20
1100	9.90
1200	9.70
1400	9.50
1600	9.50
1800	9.50
2000	9.50
2200	9.80
2400	10.10
2600	10.40
2800	10.70
3000	11.00
3500	14.63
4000	18.26
4500	21.88
5000	25.51
5500	29.14
6000	32.77
6500	36.40
7000	40.03

Baro KPa	Multiplier
65	0.82
70	0.85
75	0.88
80	0.90
85	0.93
90	0.95
95	0.97
100	1.00
105	1.03

Zero Torque: Active Fuel Management (AFM)

RPM	Pct load
400	14.00
500	13.00
600	12.30
700	11.50
800	11.00
900	10.60
1000	10.20
1100	9.90
1200	9.70
1400	9.50
1600	9.50
1800	9.50
2000	9.50
2200	9.80
2400	10.10
2600	10.40
2800	10.70
3000	11.00
3500	14.63
4000	18.26
4500	21.88
5000	25.51
5500	29.14
6000	32.77
6500	36.40
7000	40.03

Note: Zero torque is adjusted for Baro. Misfire thresholds are relative to (maximum air density PID $1188 SAE xxx) and do not shift appreciably with altitude compared to (current density as defined PID $04 SAE1979)

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Supporting Tables

Catalyst Damaging Misfire Percentage

load
Load

	0	1000	2000	3000	4000	5000	6000	7000
0	22.5	22.5	22.5	22.5	20.0	4.7	4.7	4.7
10	22.5	22.5	22.5	20.0	20.0	4.7	4.7	4.7
20	22.5	22.5	20.0	20.0	16.7	4.7	4.7	4.7
30	22.5	22.5	20.0	16.7	14.3	4.7	4.7	4.7
40	22.5	20.0	16.7	14.3	9.1	4.7	4.7	4.7
50	20.0	16.7	14.3	12.5	8.3	4.7	4.7	4.7
60	16.7	14.3	12.5	10.0	7.7	4.7	4.7	4.7
70	14.3	12.5	10.0	7.1	6.3	4.7	4.7	4.7
80	12.5	10.0	8.3	6.3	5.0	4.7	4.7	4.7
90	10.0	8.3	6.3	5.0	4.7	4.7	4.7	4.7
100	8.3	6.3	5.0	4.7	4.7	4.7	4.7	4.7

RoughRoadSource = CeRRDR_e_TOSS
Rough Road Threshold
Engine Speed

Trans
Speed

	600	800	1000	1200	1400	1600	1800	2000	2200	2400	2600	2800	3000	3500	4000	4500
100	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
200	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
300	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
400	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
500	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
600	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
700	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
800	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
900	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
1000	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
1100	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
1200	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
1300	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
1400	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0

	5000	5500	6000
100	1.0	1.0	1.0
200	1.0	1.0	1.0
300	1.0	1.0	1.0
400	1.0	1.0	1.0
500	1.0	1.0	1.0
600	1.0	1.0	1.0
700	1.0	1.0	1.0
800	1.0	1.0	1.0
900	1.0	1.0	1.0
1000	1.0	1.0	1.0
1100	1.0	1.0	1.0
1200	1.0	1.0	1.0
1300	1.0	1.0	1.0
1400	1.0	1.0	1.0

RoughRoadSource = CeRRDR_e_WheelSpeedInECM or CeRRDR_e_SerialDataFromABS
Rough Road Threshold

Kph	0	12	24	36	48	60	72	84	96	108	120	132
Accel	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Kph	144	158	170	181	194
Accel	1.00	1.00	1.00	1.00	1.00

P0114: IAT Intermittent Weight Factor

X axis is Filtered Intake Air Temperature in Deg C

Temp	-40	0	40	80	120	160	200
	1.00	1.00	1.00	1.00	1.00	1.00	1.00

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Supporting Tables

P0101, P0106, P0121, P012B, P0236, P1101: IFRD Residual Weighting Factors

TPS Residual Weight Factor based on RPM

RPM	0	400	800	1200	1600	2000	2400	2800	3200	3600	4000	4400	4800	5200	5600	6000	6200
	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

MAF Residual Weight Factor based on RPM

RPM	0	400	800	1200	1600	2000	2400	2800	3200	3600	4000	4400	4800	5200	5600	6000	6200
	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

MAF Residual Weight Factor Based on MAF Estimate

gm/sec	0.0	15.0	30.0	45.0	60.0	75.0	90.0	105.0	120.0	135.0	150.0	165.0	180.0	195.0	210.0	230.0	250.0
	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

MAP1 Residual Weight Factor based on RPM

RPM	0	400	800	1200	1600	2000	2400	2800	3200	3600	4000	4400	4800	5200	5600	6000	6200
	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

MAP2 Residual Weight Factor based on RPM

RPM	0	400	800	1200	1600	2000	2400	2800	3200	3600	4000	4400	4800	5200	5600	6000	6200
	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

MAP3 Residual Weight Factor based on RPM

RPM	0	400	800	1200	1600	2000	2400	2800	3200	3600	4000	4400	4800	5200	5600	6000	6200
	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

TIAP1 Residual Weight Factor based on RPM

RPM	0	400	800	1200	1600	2000	2400	2800	3200	3600	4000	4400	4800	5200	5600	6000	6200
	0.750	0.750	0.750	0.750	0.850	1.000	1.000	1.000	1.000	1.000	0.800	0.800	0.800	0.800	0.800	0.800	0.800

SCIAP1 Residual Weight Factor based on RPM

RPM	0	400	800	1200	1600	2000	2400	2800	3200	3600	4000	4400	4800	5200	5600	6000	6200
	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

SCIAP2 Residual Weight Factor based on RPM

RPM	0	400	800	1200	1600	2000	2400	2800	3200	3600	4000	4400	4800	5200	5600	6000	6200
	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Boost Residual Weight Factor based on % of Boost

% Boost	0.00	0.06	0.13	0.19	0.25	0.31	0.38	0.44	0.50	0.56	0.63	0.69	0.75	0.81	0.88	0.94	1.00
	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

P0101, P0106, P0121, P0236, P1101: TIAP-MAP Correlation Offset based on RPM

RPM	1000	1750	2500	3250	4000	4750	5500	6250	7000
	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0

P0101, P0106, P0121, P0236, P1101: TIAP-MAP Correlation Min Air Flow based on RPM

RPM	1000	1750	2500	3250	4000	4750	5500	6250	7000
	17.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0

P0101, P0106, P0121, P0236, P1101: TIAP-MAP Correlation Min MAP based on RPM

RPM	1000	1750	2500	3250	4000	4750	5500	6250	7000
	110.0	130.0	135.0	140.0	140.0	145.0	150.0	150.0	150.0

P0101, P0106, P0121, P0236, P1101: TIAP-Baro Correlation Offset based on RPM

RPM	1000	1750	2500	3250	4000	4750	5500	6250	7000
	0.0	1.5	3.5	6.0	9.0	12.0	16.0	20.0	25.0

P0101, P0106, P0121, P0236, P1101: TIAP-Baro Correlation Max Air Flow based on RPM

RPM	1000	1750	2500	3250	4000	4750	5500	6250	7000
	6.0	9.0	13.0	16.0	20.0	24.0	28.0	31.0	32.0

P0101, P0106, P0121, P0236, P1101: TIAP-Baro Correlation Max MAP based on RPM

RPM	1000	1750	2500	3250	4000	4750	5500	6250	7000
	55.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0

Supporting Tables

Supercharger Intake Flow Rationality Diagnostic Failure Matrix						
TPS Model Failure	MAF Model Failure	MAP 1 Model Failure	MAP 2 Model Failure	SCIAP 1 Model Failure	SCIAP 2 Model Failure	DTC Set
F	F	F	F	F	F	No DTC
F	F	F	F	F	T	No DTC
F	F	F	F	T	F	No DTC
F	F	F	F	T	T	P012B
F	F	F	T	F	F	No DTC
F	F	F	T	F	T	P1101
F	F	F	T	T	F	P1101
F	F	F	T	T	T	P1101
F	F	T	F	F	F	No DTC
F	F	T	F	F	T	P1101
F	F	T	F	T	F	P1101
F	F	T	F	T	T	P1101
F	F	T	T	F	F	P0106
F	F	T	T	F	T	P1101
F	F	T	T	T	F	P1101
F	F	T	T	T	T	P1101
F	T	F	F	F	F	No DTC
F	T	F	F	F	T	P0101
F	T	F	F	T	F	No DTC
F	T	F	F	T	T	P0101, P012B
F	T	F	T	F	F	P1101
F	T	F	T	F	T	P0101
F	T	F	T	T	F	P1101
F	T	F	T	T	T	P0101, P012B
F	T	T	F	F	F	P1101
F	T	T	F	F	T	P1101
F	T	T	F	T	F	P1101
F	T	T	F	T	T	P1101
F	T	T	T	F	F	P1101
F	T	T	T	F	T	P1101
F	T	T	T	T	F	P1101
F	T	T	T	T	T	P1101
T	F	F	F	F	F	P0121
T	F	F	F	F	T	No DTC
T	F	F	F	T	F	P0121
T	F	F	F	T	T	P1101
T	F	F	T	F	F	P1101
T	F	F	T	F	T	P1101
T	F	F	T	T	F	P1101
T	F	F	T	T	T	P1101
T	F	T	F	F	F	P0121
T	F	T	F	F	T	P1101
T	F	T	F	T	F	P0121
T	F	T	F	T	T	P1101
T	F	T	T	F	F	P1101
T	F	T	T	F	T	P1101
T	F	T	T	T	F	P1101
T	F	T	T	T	T	P1101
T	T	F	F	F	F	P0121
T	T	F	F	F	T	P1101
T	T	F	F	T	F	P0121
T	T	F	F	T	T	P1101
T	T	F	T	F	F	P1101
T	T	F	T	F	T	P1101
T	T	F	T	T	F	P1101
T	T	F	T	T	T	P1101
T	T	T	F	F	F	P0121
T	T	T	F	F	T	P1101
T	T	T	F	T	F	P0121
T	T	T	F	T	T	P1101
T	T	T	T	F	F	P1101
T	T	T	T	F	T	P1101
T	T	T	T	T	F	P1101
T	T	T	T	T	T	P1101

Supporting Tables

Turbocharger Intake Flow Rationality Diagnostic Failure Matrix								
MAF Model Failure	MAP 1 Model Failure	MAP 2 Model Failure	MAP 3 Model Failure	TIAP 1 Model Failure	TPS Model Failure	TIAP Correlation Failure	TIAP Correlation Valid	DTC Set
F	F	F	F	F	F	F	F	No DTC
F	F	F	F	F	F	F	T	No DTC
F	F	F	F	F	F	T	F	No DTC
F	F	F	F	F	F	T	T	No DTC
F	F	F	F	F	T	F	F	No DTC
F	F	F	F	F	T	F	T	No DTC
F	F	F	F	F	T	T	F	No DTC
F	F	F	F	F	T	T	T	No DTC
F	F	F	F	T	F	F	F	No DTC
F	F	F	F	T	F	F	T	No DTC
F	F	F	F	T	F	T	F	No DTC
F	F	F	F	T	F	T	T	No DTC
F	F	F	F	T	T	F	F	P1101
F	F	F	F	T	T	F	T	P0121
F	F	F	F	T	T	T	F	P1101
F	F	F	F	T	T	T	T	P0236
F	F	F	T	F	F	F	F	P1101
F	F	F	T	F	F	F	T	P1101
F	F	F	T	F	F	T	F	P1101
F	F	F	T	F	F	T	T	P1101
F	F	F	T	F	T	F	F	P1101
F	F	F	T	F	T	F	T	P1101
F	F	F	T	F	T	T	F	P1101
F	F	F	T	F	T	T	T	P1101
F	F	F	T	T	F	F	F	P1101
F	F	F	T	T	F	F	T	P1101
F	F	F	T	T	F	T	F	P1101
F	F	F	T	T	F	T	T	P1101
F	F	F	T	T	T	F	F	P1101
F	F	F	T	T	T	F	T	P1101
F	F	F	T	T	T	T	F	P1101
F	F	F	T	T	T	T	T	P1101
F	F	T	F	F	F	F	F	P1101
F	F	T	F	F	F	F	T	P1101
F	F	T	F	F	F	T	F	P1101
F	F	T	F	F	F	T	T	P1101
F	F	T	F	F	T	F	F	P1101
F	F	T	F	F	T	F	T	P1101
F	F	T	F	F	T	T	F	P1101
F	F	T	F	F	T	T	T	P1101
F	F	T	F	T	F	F	F	P1101
F	F	T	F	T	F	F	T	P1101
F	F	T	F	T	F	T	F	P1101
F	F	T	F	T	F	T	T	P1101
F	F	T	F	T	T	F	F	P1101
F	F	T	F	T	T	F	T	P1101
F	F	T	F	T	T	T	F	P1101
F	F	T	F	T	T	T	T	P1101
F	F	T	T	F	F	F	F	P1101
F	F	T	T	F	F	F	T	P1101
F	F	T	T	F	F	T	F	P1101
F	F	T	T	F	F	T	T	P1101
F	F	T	T	F	T	F	F	P1101
F	F	T	T	F	T	F	T	P1101
F	F	T	T	F	T	T	F	P1101
F	F	T	T	F	T	T	T	P1101
F	F	T	T	T	F	F	F	No DTC
F	F	T	T	T	F	F	T	No DTC
F	F	T	T	T	F	T	F	No DTC
F	F	T	T	T	F	T	T	No DTC
F	F	T	T	T	T	F	F	P1101
F	F	T	T	T	T	F	T	P1101
F	F	T	T	T	T	T	F	P1101
F	F	T	T	T	T	T	T	P1101
F	T	F	F	F	F	F	F	P1101

Supporting Tables

Turbocharger Intake Flow Rationality Diagnostic Failure Matrix (Con't)								
MAF Model Failure	MAP 1 Model Failure	MAP 2 Model Failure	MAP 3 Model Failure	TIAP 1 Model Failure	TPS Model Failure	TIAP Correlation Failure	TIAP Correlation Valid	DTC Set
F	T	F	F	F	F	F	T	P1101
F	T	F	F	F	F	T	F	P1101
F	T	F	F	F	F	T	T	P0236
F	T	F	F	F	T	F	F	P1101
F	T	F	F	F	T	F	T	P0121
F	T	F	F	F	T	T	F	P1101
F	T	F	F	F	T	T	T	P0236
F	T	F	F	T	F	F	F	P1101
F	T	F	F	T	F	F	T	P1101
F	T	F	F	T	F	T	F	P1101
F	T	F	F	T	F	T	T	P0236
F	T	F	F	T	T	F	F	P1101
F	T	F	F	T	T	F	T	P0121
F	T	F	F	T	T	T	F	P1101
F	T	F	F	T	T	T	T	P0236
F	T	F	T	F	F	F	F	P1101
F	T	F	T	F	F	F	T	P1101
F	T	F	T	F	F	T	F	P1101
F	T	F	T	F	F	T	T	P1101
F	T	F	T	F	T	F	F	P1101
F	T	F	T	F	T	F	T	P1101
F	T	F	T	F	T	T	F	P1101
F	T	F	T	F	T	T	T	P1101
F	T	F	T	T	F	F	F	P1101
F	T	F	T	T	F	F	T	P1101
F	T	F	T	T	F	T	F	P1101
F	T	F	T	T	F	T	T	P1101
F	T	F	T	T	T	F	F	P1101
F	T	F	T	T	T	F	T	P1101
F	T	F	T	T	T	T	F	P1101
F	T	F	T	T	T	T	T	P1101
F	T	T	F	F	F	F	F	P1101
F	T	T	F	F	F	F	T	P1101
F	T	T	F	F	F	T	F	P1101
F	T	T	F	F	F	T	T	P1101
F	T	T	F	F	T	F	F	P1101
F	T	T	F	F	T	F	T	P1101
F	T	T	F	F	T	T	F	P1101
F	T	T	F	F	T	T	T	P1101
F	T	T	F	T	F	F	F	P1101
F	T	T	F	T	F	F	T	P1101
F	T	T	F	T	F	T	F	P1101
F	T	T	F	T	F	T	T	P1101
F	T	T	F	T	T	F	F	P1101
F	T	T	F	T	T	F	T	P1101
F	T	T	F	T	T	T	F	P1101
F	T	T	F	T	T	T	T	P1101
F	T	T	T	F	F	F	F	P0106
F	T	T	T	F	F	F	T	P0106
F	T	T	T	F	F	T	F	P0106
F	T	T	T	F	F	T	T	P0106
F	T	T	T	F	T	F	F	P1101
F	T	T	T	F	T	F	T	P1101
F	T	T	T	F	T	T	F	P1101
F	T	T	T	F	T	T	T	P1101
F	T	T	T	T	F	F	F	P1101
F	T	T	T	T	F	F	T	P1101
F	T	T	T	T	F	T	F	P1101
F	T	T	T	T	F	T	T	P1101
F	T	T	T	T	T	F	F	P1101
F	T	T	T	T	T	F	T	P1101
F	T	T	T	T	T	T	F	P1101
F	T	T	T	T	T	T	T	P1101
T	F	F	F	F	F	F	F	P1101
T	F	F	F	F	F	F	T	P1101

Supporting Tables

Turbocharger Intake Flow Rationality Diagnostic Failure Matrix (Con't)								
MAF Model Failure	MAP 1 Model Failure	MAP 2 Model Failure	MAP 3 Model Failure	TIAP 1 Model Failure	TPS Model Failure	TIAP Correlation Failure	TIAP Correlation Valid	DTC Set
T	F	F	F	F	F	T	F	P1101
T	F	F	F	F	F	T	T	P0236
T	F	F	F	F	T	F	F	P1101
T	F	F	F	F	T	F	T	P0121
T	F	F	F	F	T	T	F	P1101
T	F	F	F	F	T	T	T	P0236
T	F	F	F	T	F	F	F	P1101
T	F	F	F	T	F	F	T	P1101
T	F	F	F	T	F	T	F	P1101
T	F	F	F	T	F	T	T	P0236
T	F	F	F	T	T	F	F	P1101
T	F	F	F	T	T	F	T	P0121
T	F	F	F	T	T	T	F	P1101
T	F	F	F	T	T	T	T	P0236
T	F	F	T	F	F	F	F	P1101
T	F	F	T	F	F	F	T	P1101
T	F	F	T	F	F	T	F	P1101
T	F	F	T	F	F	T	T	P1101
T	F	F	T	F	T	F	F	P1101
T	F	F	T	F	T	F	T	P1101
T	F	F	T	F	T	T	F	P1101
T	F	F	T	F	T	T	T	P1101
T	F	F	T	T	F	F	F	P1101
T	F	F	T	T	F	F	T	P1101
T	F	F	T	T	F	T	F	P1101
T	F	F	T	T	F	T	T	P1101
T	F	F	T	T	T	F	F	P1101
T	F	F	T	T	T	F	T	P1101
T	F	F	T	T	T	T	F	P1101
T	F	F	T	T	T	T	T	P1101
T	F	T	F	F	F	F	F	P1101
T	F	T	F	F	F	F	T	P1101
T	F	T	F	F	F	T	F	P1101
T	F	T	F	F	F	T	T	P1101
T	F	T	F	F	T	F	F	P1101
T	F	T	F	F	T	F	T	P1101
T	F	T	F	F	T	T	F	P1101
T	F	T	F	F	T	T	T	P1101
T	F	T	F	T	F	F	F	P1101
T	F	T	F	T	F	T	F	P1101
T	F	T	F	T	F	T	T	P1101
T	F	T	F	T	T	F	F	P1101
T	F	T	F	T	T	F	T	P1101
T	F	T	F	T	T	T	F	P1101
T	F	T	F	T	T	T	T	P1101
T	F	T	T	F	F	F	F	P1101
T	F	T	T	F	F	F	T	P1101
T	F	T	T	F	F	T	F	P1101
T	F	T	T	F	F	T	T	P1101
T	F	T	T	F	T	F	F	P1101
T	F	T	T	F	T	F	T	P1101
T	F	T	T	F	T	T	F	P1101
T	F	T	T	F	T	T	T	P1101
T	F	T	T	T	F	F	F	P0101
T	F	T	T	T	F	F	T	P0101
T	F	T	T	T	F	T	F	P0101
T	F	T	T	T	F	T	T	P0101
T	F	T	T	T	T	F	F	P1101
T	F	T	T	T	T	F	T	P1101
T	F	T	T	T	T	T	F	P1101
T	F	T	T	T	T	T	T	P1101
T	T	F	F	F	F	F	F	P1101
T	T	F	F	F	F	F	T	P1101
T	T	F	F	F	F	T	F	P1101

Supporting Tables

Turbocharger Intake Flow Rationality Diagnostic Failure Matrix (Con't)								
MAF Model Failure	MAP 1 Model Failure	MAP 2 Model Failure	MAP 3 Model Failure	TIAP 1 Model Failure	TPS Model Failure	TIAP Correlation Failure	TIAP Correlation Valid	DTC Set
T	T	F	F	F	F	T	T	P0236
T	T	F	F	F	T	F	F	P1101
T	T	F	F	F	T	F	T	P0121
T	T	F	F	F	T	T	F	P1101
T	T	F	F	F	T	T	T	P0236
T	T	F	F	T	F	F	F	P1101
T	T	F	F	T	F	F	T	P1101
T	T	F	F	T	F	T	F	P1101
T	T	F	F	T	F	T	T	P0236
T	T	F	F	T	T	F	F	P1101
T	T	F	F	T	T	F	T	P0121
T	T	F	F	T	T	T	F	P1101
T	T	F	F	T	T	T	T	P0236
T	T	F	T	F	F	F	F	P1101
T	T	F	T	F	F	F	T	P1101
T	T	F	T	F	F	T	F	P1101
T	T	F	T	F	F	T	T	P1101
T	T	F	T	F	T	F	F	P1101
T	T	F	T	F	T	F	T	P1101
T	T	F	T	F	T	T	F	P1101
T	T	F	T	T	F	F	F	P1101
T	T	F	T	T	F	F	T	P1101
T	T	F	T	T	F	T	F	P1101
T	T	F	T	T	F	T	T	P1101
T	T	F	T	T	T	F	F	P1101
T	T	F	T	T	T	F	T	P1101
T	T	F	T	T	T	T	F	P1101
T	T	F	T	T	T	T	T	P1101
T	T	T	F	F	F	F	F	P1101
T	T	T	F	F	F	F	T	P1101
T	T	T	F	F	F	T	F	P1101
T	T	T	F	F	F	T	T	P1101
T	T	T	F	F	T	F	F	P1101
T	T	T	F	F	T	F	T	P1101
T	T	T	F	F	T	T	F	P1101
T	T	T	F	F	T	T	T	P1101
T	T	T	F	T	F	F	F	P1101
T	T	T	F	T	F	F	T	P1101
T	T	T	F	T	F	T	F	P1101
T	T	T	F	T	F	T	T	P1101
T	T	T	F	T	T	F	F	P1101
T	T	T	F	T	T	F	T	P1101
T	T	T	F	T	T	T	F	P1101
T	T	T	F	T	T	T	T	P1101
T	T	T	T	F	F	F	F	P1101
T	T	T	T	F	F	T	F	P1101
T	T	T	T	F	T	F	F	P1101
T	T	T	T	F	T	F	T	P1101
T	T	T	T	F	T	T	F	P1101
T	T	T	T	F	T	T	T	P1101
T	T	T	T	T	F	F	F	P1101
T	T	T	T	T	F	F	T	P1101
T	T	T	T	T	F	T	F	P1101
T	T	T	T	T	F	T	T	P1101
T	T	T	T	T	T	F	F	P1101
T	T	T	T	T	T	F	T	P1101
T	T	T	T	T	T	T	F	P1101
T	T	T	T	T	T	T	T	P1101

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Supporting Tables

P00B6: Fail if power up ECT exceeds RCT by these values

Z axis is the Fast Failure temp difference (° C)
X axis is IAT Temperature at Power up (° C)

-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
80	80	80	60	60	40	40	30	30	30	30	30	30	30	30	30	30

P0116: Fail if power up ECT exceeds IAT by these values

Z axis is the Fast Failure temp difference (° C)
X axis is IAT Temperature at Power up (° C)

-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
80	80	80	60	60	40	40	30	30	30	30	30	30	30	30	30	30

P0128: Maximum Total Energy transferred to Cooling System for IAT and Start-up ECT conditions

Z axis is the cooling system energy failure threshold (grams)
X axis is ECT Temperature at Power up (° C)
Y axis is IAT min during test (° C)

	IAT Range												
	Low	Hi	-40	-28	-16	-4	8	20	32	44	56	68	80
Primary	10.0 ° C	52.0 ° C	6636	6636	6636	6636	6636	5640	4644	3648	2652	1656	1656
Alternate	-7.0 ° C	10.0 ° C	7280	7280	7280	6320	5360	4400	3440	2480	1520	1520	1520

P0133 - O2S Slow Response Bank 1 Sensor 1" Pass/Fail Threshold table

Z axis is the pass/fail result (see note below)
X axis is Lean to Rich response time (msec)
Y axis is Rich to Lean response time (msec)
Note: If the cell contains a "0" then the fault is not indicated, if it contains a "1" a fault is indicated

	0.000	0.010	0.021	0.033	0.045	0.057	0.068	0.080	0.092	0.104	0.115	0.127	0.139	0.150	0.162	0.174	1.000
0.000	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0.010	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0.021	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0.032	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0.043	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0.055	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0.065	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0.077	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0.088	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0.100	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0.110	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0.121	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0.133	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0.144	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0.155	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0.166	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
1.000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Supporting Tables

P0153 - O2S Slow Response Bank 2 Sensor 1" Pass/Fail Threshold table

Z axis is the pass/fail result (see note below)
X axis is Lean to Rich response time (msec)
Y axis is Rich to Lean response time (msec)
Note: If the cell contains a "0" then the fault is not indicated, if it contains a "1" a fault is indicated

	0.000	0.020	0.030	0.040	0.050	0.060	0.070	0.080	0.090	0.100	0.110	0.120	0.130	0.140	0.150	0.160	1.000
0.000	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
0.020	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
0.030	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
0.040	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
0.050	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
0.060	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
0.070	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
0.080	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
0.090	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
0.100	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
0.110	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
0.120	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
0.130	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
0.140	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
0.150	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
0.160	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1.000	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

P1133 - O2S HC L to R Switches Limit Bank 1 Sensor 1" Pass/Fail Threshold table

Z axis is Limit for L/R HC switches
Y axis is Average flow during the response test (gps)
X axis is estimated Ethanol percentage
Note: The cell contains the minumum switches

	0.0	25.0	50.0	75.0	100.0
0.0	26	24	22	21	19
6.3	25	24	22	21	19
12.5	25	23	22	21	20
18.8	24	23	22	21	20
25.0	24	23	22	21	20
31.3	23	22	22	21	20
37.5	22	22	22	21	21
43.8	22	22	21	21	21
50.0	21	21	21	21	21
56.3	21	21	21	21	21
62.5	21	21	21	21	21
68.8	21	21	21	21	21
75.0	21	21	21	21	21
81.3	21	21	21	21	21
87.5	21	21	21	21	21
93.8	21	21	21	21	21
100.0	21	21	21	21	21

12 OBDGS2 Engine Diagnostics

Supporting Tables

P1133 - O2S HC R to L Switches Limit Bank 1 Sensor 1" Pass/Fail Threshold table

Z axis is Limit for R/L HC switches
Y axis is Average flow during the response test (gps)
X axis is estimated Ethanol percentage
Note: The cell contains the minumum switches

	0.0	25.0	50.0	75.0	100.0
0.0	26	24	23	21	19
6.3	26	24	23	21	20
12.5	25	24	22	21	20
18.8	24	23	22	21	20
25.0	24	23	22	21	20
31.3	23	22	22	21	20
37.5	23	22	21	21	20
43.8	22	21	21	21	20
50.0	21	21	21	21	21
56.3	21	21	21	21	21
62.5	21	21	21	21	21
68.8	21	21	21	21	21
75.0	21	21	21	21	21
81.3	21	21	21	21	21
87.5	21	21	21	21	21
93.8	21	21	21	21	21
100.0	21	21	21	21	21

Green Sensor Delay Criteria:

The specific diagnostic (from summary table) will not be enabled until the next ignition cycle after the airflow criteria below (by sensor location) has been met:

* B1S1 Airflow greater than 22 gps for 100000 grams of accumulated flow non-continuously.
* B1S2 Airflow greater than 22 gps for 100000 grams of accumulated flow non-continuously.
* B2S1 Airflow greater than 22 gps for 100000 grams of accumulated flow non-continuously.
* B2S2 Airflow greater than 22 gps for 100000 grams of accumulated flow non-continuously.

Note that all other enable criteria must be met on the next ignition cycle for the test to run on that ignition cycle.
Note: This feature is only enabled when the vehicle is new and cannot be enabled in service

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P00C6 **KtFHPD_p_HPS_PressFallLoThrsh**

Coolant Axis

Eth %	**-40**	**-32**	**-24**	**-16**	**-8**	**0**	**8**	**16**	**20**	**24**	**32**	**40**	**48**	**64**	**80**	**96**	**112**
0.0000	2.0	2.0	2.0	2.0	2.0	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
12.5000	**2.0**	2.0	2.0	2.0	2.0	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
25.0000	**2.0**	2.0	2.0	2.0	2.0	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
37.5000	**2.0**	2.0	2.0	2.0	2.0	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
50.0000	**2.0**	2.0	2.0	2.0	2.0	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
62.5000	**2.0**	2.0	2.0	2.0	2.0	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
75.0000	**2.0**	2.0	2.0	2.0	2.0	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
87.5000	**2.0**	2.0	2.0	2.0	2.0	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
100.0000	**2.0**	2.0	2.0	2.0	2.0	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5

P00C6 **KtFHPD_Cnt_HPS_PressFallLoThrsh**

Coolant Axis

Eth %	**-40**	**-32**	**-24**	**-16**	**-8**	**0**	**8**	**16**	**20**	**24**	**32**	**40**	**48**	**64**	**80**	**96**	**112**
0.0000	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
12.5000	**10.0**	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
25.0000	**10.0**	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
37.5000	**10.0**	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
50.0000	**10.0**	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
62.5000	**10.0**	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
75.0000	**10.0**	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
87.5000	**10.0**	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
100.0000	**10.0**	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0

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Supporting Tables

P00C6 **KtFHPC_p_HighPressStart**

Coolant Axis

Eth %	**-40**	**-32**	-24	-16	-8	0	8	16	20	24	32	40	48	64	80	96	112
0.0000	6.3	6.3	6.3	5.0	2.5	1.6	1.3	1.0	0.8	0.8	0.8	0.8	0.8	0.7	0.4	0.4	0.4
12.5000	**6.3**	6.3	6.3	5.0	2.5	1.6	1.3	1.0	0.8	0.8	0.8	0.8	0.8	0.7	0.4	0.4	0.4
25.0000	**7.8**	7.8	7.8	7.0	4.8	2.5	1.7	1.4	1.1	1.1	1.1	0.9	0.9	0.7	0.4	0.4	0.4
37.5000	**10.3**	10.3	10.3	9.0	5.8	2.5	2.1	1.7	1.5	1.4	1.4	0.9	0.9	0.7	0.4	0.4	0.4
50.0000	**10.3**	10.3	10.3	9.0	6.5	4.0	2.4	2.1	1.8	1.7	1.6	1.0	1.0	0.7	0.4	0.4	0.4
62.5000	**10.3**	10.3	10.3	9.0	6.5	4.0	2.8	2.5	2.1	2.0	1.9	1.1	1.0	0.7	0.4	0.4	0.4
75.0000	**10.3**	10.3	10.3	10.0	7.0	5.0	3.2	2.8	2.4	2.3	2.2	1.1	1.1	0.7	0.4	0.4	0.4
87.5000	**12.3**	12.3	12.3	12.0	10.5	7.0	3.2	2.8	2.4	2.3	2.2	1.1	1.1	0.7	0.4	0.4	0.4
100.0000	**12.3**	12.3	12.3	12.0	10.5	7.0	3.2	2.8	2.4	2.3	2.2	1.1	1.1	0.7	0.4	0.4	0.4

P00C6 **KtFHPC_t_HighPressStartTmout**

Coolant Axis

-40	**-32**	-24	-16	-8	0	8	16	20	24	32	40	48	64	80	96	112
12.8	12.8	11.5	10.0	8.0	5.8	5.3	5.0	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	6.0

P0089
P163A
P228C
P228D
P0191 **KtFHPD_t_PumpCntrlEngRunThrsh**

-30	-20	-10	0	10	20	80	100	110
30.0	30.0	30.0	20.0	10.0	10.0	20.0	30.0	30.0

P0191 **KtFHPD_t_SnsPrfStuckCrankTmout**

-30	-20	-10	0	10	20	80	100	110
10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0

P0191 **KtFHPD_Cnt_SnsPrfIdlePumpOffDly(12.5 ms loop rate)**

Baro

Eth %	**65**	**70**	**75**	**80**	**85**	**90**	**95**	**100**	**105**
0.0000	240.0	240.0	240.0	240.0	240.0	240.0	240.0	240.0	240.0
12.5000	240.0	240.0	240.0	240.0	240.0	240.0	240.0	240.0	240.0
25.0000	230.0	230.0	230.0	230.0	230.0	230.0	230.0	230.0	230.0
37.5000	220.0	220.0	220.0	220.0	220.0	220.0	220.0	220.0	220.0
50.0000	210.0	210.0	210.0	210.0	210.0	210.0	210.0	210.0	210.0
62.5000	200.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0
75.0000	190.0	190.0	190.0	190.0	190.0	190.0	190.0	190.0	190.0
87.5000	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0
100.0000	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0

P0234, P0299

KtBSTD_p_CntrlDevNegLim [kPa]

X axis pressure [kPa]
Y axis is Engine Speed [rpm]

	130.0000	140.0000	160.0000	180.0000	200.0000	220.0000	240.0000	260.0000	280.0000	300.0000
1000.0000	-100.0000	-100.0000	-100.0000	-100.0000	-100.0000	-100.0000	-100.0000	-100.0000	-100.0000	-100.0000
1500.0000	-100.0000	-80.0000	-80.0000	-80.0000	-80.0000	-80.0000	-80.0000	-80.0000	-80.0000	-80.0000
2000.0000	-100.0000	-30.0000	-30.0000	-25.0000	-20.0000	-15.0000	-15.0000	-15.0000	-15.0000	-15.0000
2500.0000	-100.0000	-30.0000	-30.0000	-25.0000	-20.0000	-15.0000	-15.0000	-15.0000	-15.0000	-15.0000
3000.0000	-100.0000	-30.0000	-30.0000	-25.0000	-20.0000	-15.0000	-15.0000	-15.0000	-15.0000	-15.0000
3500.0000	-100.0000	-30.0000	-30.0000	-25.0000	-20.0000	-15.0000	-15.0000	-15.0000	-15.0000	-15.0000
4000.0000	-100.0000	-30.0000	-30.0000	-25.0000	-20.0000	-15.0000	-15.0000	-15.0000	-15.0000	-15.0000
4500.0000	-100.0000	-30.0000	-30.0000	-25.0000	-20.0000	-15.0000	-15.0000	-15.0000	-15.0000	-15.0000
5000.0000	-100.0000	-30.0000	-30.0000	-25.0000	-20.0000	-15.0000	-15.0000	-15.0000	-15.0000	-15.0000
6000.0000	-100.0000	-30.0000	-30.0000	-25.0000	-20.0000	-15.0000	-15.0000	-15.0000	-15.0000	-15.0000

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Supporting Tables

KtBSTD_p_CntrlDevPosLim [kPa]

X axis is pressure [kPa]
Y axis is Engine Speed [rpm]

	130.0000	140.0000	160.0000	180.0000	200.0000	220.0000	240.0000	260.0000	280.0000	300.0000
1000.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000
1500.0000	100.0000	80.0000	80.0000	80.0000	80.0000	80.0000	80.0000	80.0000	80.0000	80.0000
2000.0000	100.0000	80.0000	80.0000	75.0000	70.0000	65.0000	60.0000	50.0000	30.0000	20.0000
2500.0000	100.0000	75.0000	70.0000	60.0000	55.0000	50.0000	45.0000	30.0000	20.0000	15.0000
3000.0000	100.0000	55.0000	50.0000	45.0000	40.0000	35.0000	30.0000	20.0000	15.0000	15.0000
3500.0000	100.0000	40.0000	30.0000	20.0000	20.0000	20.0000	20.0000	20.0000	15.0000	15.0000
4000.0000	100.0000	30.0000	20.0000	20.0000	20.0000	20.0000	20.0000	20.0000	15.0000	15.0000
4500.0000	100.0000	20.0000	20.0000	20.0000	20.0000	20.0000	20.0000	20.0000	15.0000	15.0000
5000.0000	100.0000	20.0000	20.0000	20.0000	20.0000	20.0000	20.0000	20.0000	15.0000	15.0000
6000.0000	100.0000	20.0000	20.0000	20.0000	20.0000	20.0000	20.0000	20.0000	15.0000	15.0000

KtBSTD_p_CntrlDevAmbAirCorr [kPa]

X axis is pressure [kPa]
Y axis is Ambient Pressure [kPa]

	60.0000	70.0000	80.0000	90.0000	100.0000	110.0000
1500.0000	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000
2500.0000	60.0000	50.0000	40.0000	20.0000	0.0000	0.0000
3000.0000	30.0000	20.0000	10.0000	0.0000	0.0000	0.0000
4000.0000	30.0000	20.0000	10.0000	0.0000	0.0000	0.0000
5000.0000	25.0000	10.0000	5.0000	0.0000	0.0000	0.0000
6000.0000	15.0000	5.0000	5.0000	0.0000	0.0000	0.0000

P00C4, P2261

KtBSTD_r_SurgeLim [-]

Axis is Corrected Air Mass Flow [g/s]

0.0000	1.0000
38.0890	1.5784
76.6263	2.4442
100.0000	2.7000
143.5191	3.1000
189.1064	3.4125

P226B

KtBSTD_r_ExcsvBstPresLim [-]

Axis is Corrected Air Mass Flow [g/s]

0.0000	1.0000
0.0250	1.4000
0.0500	1.9000
0.0750	2.4000
0.1000	2.5500
0.1250	2.7000
0.1500	3.1000
0.1750	3.3000

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Supporting Tables

P0324/P0326 Abnormal Noise Threshold (same table used for both):

Y-axis: Engine Speed (RPM) \ X-axis: Engine Air Flow (mg per cylinder)	100	300	700	1200
500	0.0337	0.0337	0.0337	0.0337
1000	0.0320	0.0320	0.0320	0.0320
1500	0.0308	0.0308	0.0308	0.0308
2000	0.0300	0.0300	0.0300	0.0300
2500	0.0290	0.0290	0.0290	0.0290
3000	0.0368	0.0368	0.0368	0.0368
3500	0.0527	0.0527	0.0527	0.0527
4000	0.0563	0.0563	0.0563	0.0563
4500	0.0373	0.0373	0.0373	0.0373
5000	0.0546	0.0546	0.0546	0.0546
5500	0.0557	0.0557	0.0557	0.0557
6000	0.0733	0.0733	0.0733	0.0733
6500	0.0895	0.0895	0.0895	0.0895
7000	0.0895	0.0895	0.0895	0.0895
7500	0.0895	0.0895	0.0895	0.0895
8000	0.0895	0.0895	0.0895	0.0895
8500	0.0895	0.0895	0.0895	0.0895

P0325/P0330

Two methods are used for the Knock Sensor Open Circuit Diagnostic:

1) 20 kHz Method: 20 kHz signal is internally injected on one sensor line (Signal) and the output of the differential op-amp is checked to verify the 20 kHz travels through the sensor and back to the second
2) Normal Noise: The amplitude of the FFT (in the knock frequency range) is checked to verify there is a knock signal within an expected range.

KtKNKD_e_OpenMethod is the cal table used to determine which Open Circuit method is used: '0' = Disabled; '1' = 20 kHz Method; '2' = Normal Noise Methoc

Y-axis: Engine Speed (RPM) \ X-axis: Engine Air Flow (mg per cylinder)	100	300	700	1200
500	1	1	1	1
1000	1	1	1	1
1500	1	1	1	1
2000	1	1	1	1
2500	1	1	1	1
3000	1	1	1	1
3500	1	1	1	1
4000	1	1	1	1
4500	1	1	1	1
5000	1	1	1	1
5500	1	1	1	1
6000	1	1	1	1
6500	1	1	1	1
7000	1	1	1	1
7500	1	1	1	1
8000	1	1	1	1
8500	1	1	1	1

Open Circuit Thresholds:

1. 20 kHz Method:

Engine Speed (RPM):	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500
OpenCktThrshMin:	1.3477	1.3242	1.3105	1.3066	1.3066	1.3066	1.3047	1.2949	1.2754	1.2402	1.1855	1.1094	1.0078	0.8750	0.7324	0.7793	0.8320

Engine Speed (RPM):	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500
OpenCktThrshMax:	3.9023	3.8340	3.8086	3.8066	3.8203	3.8320	3.8262	3.7949	3.7188	3.5859	3.3809	3.0938	2.7070	2.2070	1.5820	0.8164	0.0000

2. Normal Noise Method:

Engine Speed (RPM):	2700	2900	3000	3250	3500	3750	4000	4250	4500	4750	5000	5500	6000	6500	7000	7500	8500
OpenCktThrshMin:	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Engine Speed (RPM):	2700	2900	3000	3250	3500	3750	4000	4250	4500	4750	5000	5500	6000	6500	7000	7500	8500
OpenCktThrshMax:	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

12 OBDGS2 Engine Diagnostics

Supporting Tables

P06B6/P06B7

Engine Speed (RPM):	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500
OpenTestThreshLo	0.0059	0.0117	0.0137	0.0137	0.0137	0.0176	0.0234	0.0352	0.0566	0.0859	0.1289	0.1836	0.2559	0.3438	0.4512	0.5801	0.7324

Engine Speed (RPM):	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500
OpenTestThreshHi	0.0273	0.0293	0.0293	0.0332	0.0391	0.0547	0.0781	0.1172	0.1719	0.2461	0.3438	0.4648	0.6172	0.7988	1.0156	1.2695	1.5645

P0068: MAP / MAF / TPS Correleation

X-axis is TPS (%)
Data is MAP threshold (kPa)

X-axis	5.00	10.00	15.00	20.00	25.00	30.00	35.00	40.00	100.00
Data	37.45	44.08	46.55	45.54	46.96	41.86	255.00	255.00	255.00

X axis is TPS (%)
Data is MAF threshold (grams/sec)

X-axis	5.00	10.00	15.00	20.00	25.00	30.00	35.00	40.00	100.00
Data	9.38	12.13	16.89	19.20	29.84	49.55	255.00	255.00	255.00

X axis is Engine Speed (RPM)
Data is max MAF vs RPM (grams/sec)

X-axis	600.00	1400.00	2200.00	3000.00	3800.00	4600.00	5400.00	6200.00	7000.00
Data	17.90	39.19	63.43	80.91	112.92	138.31	168.70	174.20	176.70

X axis is Battery Voltage (V)
Data is max MAF vs Voltage (grams/sec)

X-axis	6.00	7.00	8.00	9.00	10.00	11.00	12.00	13.00	14.00
Data	6.50	25.00	65.00	140.00	260.00	300.00	300.70	300.70	300.70

P1682: Ignition Voltage Correleation

X-axis is IAT (DegC)
Data is Voltage threshold (V)

X-axis	23.00	85.00	95.00	105.00	125.00
Data	7.00	8.70	9.00	9.20	10.00

P0606: Processor Performance Check - ETC software is not executed in proper order

X-axis is task loop time
Data is threshold (seconds)

X-axis	CePISR_e_6p25msSeq	CePISR_e_12p5msSeq	CePISR_e_25msSeq	CePISR_e_LORES_C
Data	0.175	0.175	0.175	409.594

X-axis is task loop time
Data indicates if feature is enabled

X-axis	CePISR_e_6p25msSeq	CePISR_e_12p5msSeq	CePISR_e_25msSeq	CePISR_e_LORES_C
Data	1	1	0	0

Supporting Tables

P16F3: No fast unmanaged retarded spark above the applied spark

X-axis is Erpm
Y-axis is Air per Clyinder (mg)
Data is spark delta threshold (kPa)

KtSPRK_phi_DeltTorqueScrtyAdv

APC/Erpm	500.00	980.74	1461.48	1942.23	2422.97	2903.71	3384.45	3865.20	4345.94	4826.68	5307.42	5788.16	6268.91	6749.65	7230.39	7711.13	8191.88
80.00	39.84	39.33	34.78	30.41	29.75	27.42	27.06	27.19	25.36	23.09	26.31	26.23	28.00	28.47	28.47	28.47	28.47
160.00	38.08	37.47	29.19	25.38	25.50	26.58	25.27	23.36	21.47	19.89	23.16	23.67	24.63	24.92	24.92	24.92	24.92
240.00	36.13	34.89	25.00	21.78	21.41	21.73	20.97	19.94	18.63	17.45	20.69	21.56	22.00	22.19	22.19	22.19	22.19
320.00	30.55	29.80	21.81	18.72	18.27	18.36	17.94	17.39	16.44	15.53	18.13	19.33	19.67	19.77	19.77	19.77	19.77
400.00	26.47	26.02	19.34	16.39	15.89	15.88	15.69	15.44	14.72	13.98	16.05	17.25	17.05	17.03	17.03	17.03	17.03
480.00	23.34	23.08	17.38	14.56	14.05	14.00	13.94	13.88	13.33	12.72	14.39	15.17	14.78	14.77	14.77	14.77	14.77
560.00	20.88	20.75	15.78	13.11	12.59	12.52	12.53	12.59	12.17	11.66	13.06	13.56	13.05	13.03	13.03	13.03	13.03
640.00	18.89	18.81	14.42	11.92	11.42	11.31	11.41	11.55	11.20	10.77	11.95	12.25	11.67	11.66	11.66	11.66	11.66
720.00	17.25	17.19	13.30	10.94	10.44	10.31	10.45	10.64	10.38	10.00	10.97	11.14	10.56	10.55	10.55	10.55	10.55
800.00	15.86	15.83	12.22	10.08	9.63	9.48	9.64	9.88	9.66	9.33	10.13	10.19	9.64	9.63	9.63	9.63	9.63
880.00	14.69	14.67	11.27	9.34	8.91	8.75	8.92	9.20	9.03	8.73	9.41	9.41	8.88	8.86	8.86	8.86	8.86
960.00	13.67	13.66	10.45	8.70	8.28	8.05	8.19	8.42	8.36	8.23	8.77	8.72	8.22	8.20	8.20	8.20	8.20
1040.00	12.78	12.78	9.75	8.16	7.73	7.45	7.55	7.75	7.77	7.72	8.20	8.14	7.66	7.64	7.64	7.64	7.64
1120.00	12.02	12.02	9.13	7.67	7.25	6.94	7.02	7.19	7.20	7.20	7.69	7.63	7.16	7.16	7.16	7.16	7.16
1200.00	11.33	11.34	8.59	7.23	6.80	6.48	6.55	6.69	6.73	6.75	7.22	7.17	6.72	6.72	6.72	6.72	6.72
1280.00	10.72	10.73	8.11	6.84	6.38	6.08	6.14	6.27	6.31	6.34	6.81	6.77	6.34	6.33	6.33	6.33	6.33
1360.00	10.16	10.19	7.67	6.50	6.00	5.73	5.77	5.89	5.94	6.00	6.45	6.41	6.00	5.98	5.98	5.98	5.98

P16F3: Absolute difference of the calculated Intake Manifold Pressure during engine event versus during time event

X-axis is engine torque (Nm)
Data is MAP delta threshold (kPa)

X-axis	0.00	50.00	100.00	150.00	200.00	300.00
Data	37.45	37.45	37.45	37.45	37.45	37.45

P16F3: Table to calculate limit for predicted torque for zero pedal determination.

X-axis is engine oil temp in C deg
Y-axis is engine speed RPM
Data is Torque (Nm)

	-40.00	-20.00	-10.00	0.00	50.00	90.00
300.00	150.00	150.00	150.00	150.00	150.00	150.00
500.00	150.00	146.86	146.86	146.86	146.86	150.00
600.00	150.00	145.51	145.51	145.51	145.51	150.00
700.00	150.00	144.62	144.62	144.62	144.62	150.00
800.00	150.00	142.46	142.46	142.46	142.46	150.00
900.00	150.00	140.31	140.31	140.31	140.31	150.00
1000.00	150.00	138.15	138.15	138.15	138.15	150.00
1100.00	150.00	136.00	136.00	136.00	136.00	150.00
1300.00	150.00	133.85	133.85	133.85	133.85	150.00
1500.00	150.00	129.36	129.36	129.36	129.36	150.00
1700.00	150.00	124.87	124.87	124.87	124.87	150.00
2000.00	150.00	120.38	120.38	120.38	120.38	150.00
2500.00	150.00	115.90	115.90	115.90	115.90	150.00
3000.00	150.00	106.92	106.92	106.92	106.92	150.00
4000.00	150.00	97.95	97.95	97.95	97.95	150.00
5000.00	150.00	88.97	88.97	88.97	88.97	150.00
6000.00	150.00	80.00	80.00	80.00	80.00	150.00

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Supporting Tables

P0442: EONV Pressure Threshold Table (in Pascals)

X axis is fuel level in %
Y axis is temperature in deg C

	0.0000	6.2499	12.4998	18.7497	24.9996	31.2495	37.4994	43.7493	49.9992	56.2491	62.4990	68.7490	74.9989	81.2488	87.4987	93.7486	99.9985
-10.0000	-249.0905	-249.0905	-249.0905	-249.0905	-249.0905	-249.0905	-249.0905	-224.2788	-186.8179	-149.3570	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453
-4.3750	-249.0905	-249.0905	-249.0905	-249.0905	-249.0905	-249.0905	-249.0905	-224.2788	-186.8179	-149.3570	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453
1.2500	-249.0905	-249.0905	-249.0905	-249.0905	-249.0905	-249.0905	-249.0905	-224.2788	-186.8179	-149.3570	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453
6.8750	-249.0905	-249.0905	-249.0905	-249.0905	-249.0905	-249.0905	-249.0905	-224.2788	-186.8179	-149.3570	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453
12.5000	-249.0905	-249.0905	-249.0905	-249.0905	-249.0905	-249.0905	-249.0905	-224.2788	-186.8179	-149.3570	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453
18.1250	-249.0905	-249.0905	-249.0905	-249.0905	-249.0905	-249.0905	-249.0905	-224.2788	-186.8179	-149.3570	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453
23.7500	-249.0905	-249.0905	-249.0905	-249.0905	-249.0905	-249.0905	-249.0905	-224.2788	-186.8179	-149.3570	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453
29.3750	-249.0905	-249.0905	-249.0905	-249.0905	-249.0905	-249.0905	-249.0905	-224.2788	-186.8179	-149.3570	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453
35.0000	-249.0905	-249.0905	-249.0905	-249.0905	-249.0905	-249.0905	-249.0905	-224.2788	-186.8179	-149.3570	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453
40.6250	-249.0905	-249.0905	-249.0905	-249.0905	-249.0905	-249.0905	-249.0905	-224.2788	-186.8179	-149.3570	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453
46.2500	-249.0905	-249.0905	-249.0905	-249.0905	-249.0905	-249.0905	-249.0905	-224.2788	-186.8179	-149.3570	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453
51.8750	-249.0905	-249.0905	-249.0905	-249.0905	-249.0905	-249.0905	-249.0905	-224.2788	-186.8179	-149.3570	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453
57.5000	-249.0905	-249.0905	-249.0905	-249.0905	-249.0905	-249.0905	-249.0905	-224.2788	-186.8179	-149.3570	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453
63.1250	-249.0905	-249.0905	-249.0905	-249.0905	-249.0905	-249.0905	-249.0905	-224.2788	-186.8179	-149.3570	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453
68.7500	-249.0905	-249.0905	-249.0905	-249.0905	-249.0905	-249.0905	-249.0905	-224.2788	-186.8179	-149.3570	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453
74.3750	-249.0905	-249.0905	-249.0905	-249.0905	-249.0905	-249.0905	-249.0905	-224.2788	-186.8179	-149.3570	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453
80.0000	-249.0905	-249.0905	-249.0905	-249.0905	-249.0905	-249.0905	-249.0905	-224.2788	-186.8179	-149.3570	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453

P0442: Estimate of Ambient Temperature Valid Conditioning Time

EAT Valid Conditioning Time (in seconds)
Axis is Ignition Off Time (in seconds)

Axis	Curve
0	350
600	350
1200	450
1800	450
2400	475
3000	475
3600	475
4200	450
4800	450
5400	450
6000	450
6600	450
7200	450
7800	400
8400	350
9000	310
9600	275
10200	225
10800	200
11700	200
12600	200
13500	200
14400	200
15300	185
16200	175
17100	165
18000	150
19200	100
20400	100
21600	100
22800	100
24000	100
25200	100

P0442: Engine Off Time Before Vehicle Off Maximum as a Function of Estimated Ambient Temperature

Engine Off Time Before Vehicle Off Maximum Table (in seconds) — **Axis is Estimated Ambient Coolant in Deg C**

Axis	-10	-4	1	7	13	18	24	29	35	41	46	52	58	63	69	74	80
Curve	44	44	44	44	68	82	105	153	320	480	480	480	480	480	480	480	480

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Supporting Tables

P0496: Purge Valve Leak Test Engine Vacuum Test Time (Cold Start) as a Function of Fuel Level

Purge Valve Leak Test Engine Vacuum Test Time (in seconds)
Axis is Fuel Level in %

Axis	Curve
0	69
6	67
12	66
19	65
25	63
31	62
37	61
44	60
50	60
56	59
62	59
69	58
75	56
81	53
87	51
94	49
100	47

P0461, P2066, P2636: Transfer Pump Enable

TransferPumpOnTimeLimit (in seconds)
Axis is Fuel Level in %

Axis	Curve
0	30
3	35
6	40
9	45
13	50
16	55
19	60
22	65
25	70
28	85
31	90
34	95
38	135
41	135
44	160
47	160
50	260
53	260
56	360
59	360
63	360
66	360
69	360
72	460
75	460
78	460
81	460
84	460
88	460
91	460
94	460
97	460
100	460

12 OBDGS2 Engine Diagnostics

Supporting Tables

Tables supporting Engine Oil Temperature Sensor

P0196

FastFailTempDiff — **AXIS is Engine Coolant Temperature at ECM Power-up, Degrees C**

Axis	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
Curve	80.0	80.0	80.0	60.0	60.0	40.0	40.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0

TotalAccumulatedFlow — **Axis is Power up Engine Oil temperature, Curve is accumulated engine grams airflow**

Axis	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
Curve	15000	14000	13000	12000	11000	10000	9000	8000	7000	6000	5000	4000	5000	4000	3000	3000	3000

P0521

EngSpeedWeightFactorTable — **AXIS is Engine RPM, Curve is Weight Factor**

Axis	0	500	900	1000	1500	1750	2000	3500	4000
Curve	0.00	0.00	0.00	0.45	0.45	0.45	0.46	0.44	0.00

EngOilTempWeightFactorTable — **AXIS is Engine Oil Temp Deg C, Curve is Weight Factor**

Axis	-40	40	60	80	90	100	120	130	140
Curve	0.58	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.00

EngLoadStabilityWeightFactorTable — **AXIS is Engine RPM, Curve is Weight Factor**

Axis	0	5	10	20	30	50	100	200	399
Curve	1.00	1.00	0.50	0.30	0.10	0.00	0.00	0.00	0.00

EngOilPredictionWeightFacotrTable — **AXIS is Engine RPM, Curve is Engine Oil Prediction Weight Factor**

Axis	0	170	250	275	360	375	400	500	600
Curve	0.00	0.00	0.10	1.00	1.00	1.00	1.00	0.86	0.00

Tables supporting Clutch Diagnostics

P0806

EngTorqueThreshold Table — **axis is Percent Clutch Pedal Position, 0 = bottom of travel**

Axis	0	6.2485	12.497	18.7455	24.994	31.2425	37.491	43.7395	49.988	56.2365	62.485	68.7335	74.982	81.2305	87.479	93.7275	99.976
Curve	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

P0806

ResidualErrorEnableLow Table — **axis is Gear**

Axis	1st	2nd	3rd	4th	5th	6th	rev	neutral
Curve	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

P0806

ResidualErrorEnableHigh Table — **axis is Gear**

Axis	1st	2nd	3rd	4th	5th	6th	rev	neutral
Curve	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Tables supporting Clutch Pedal Position Status (analog Clutch Pedal Position Sensor applications only):

Clutch Pedal Top of Travel Achieved criteria
The clutch pedal Top of Travel state will transition from FALSE to TRUE when the following occurs
Clutch Pedal Position <= 88 %
for > 3 counts each count is equal to 12.5ms

Clutch Disengaged criteria
The clutch state will transition from engaged to disengaged when the following occurs:
Clutch Pedal Position <= 40 %
for > 3 counts each count is equal to 12.5ms

Clutch Pedal Bottom of Travel Achieved criteria
The clutch pedal Bottom of Travel state will transition from FALSE to TRUE when the following occurs
Clutch Pedal Position < 25 %
for > 3 counts each count is equal to 12.5ms

12 OBDGS2 Engine Diagnostics

Supporting Tables

FASD Section
P0171, P0172, P0174, P0175

The following table defines the Long Fuel Trim cells utilized for FASD diagnosis (cells identified with a "Yes" are enabled, and with a "NO" are disabled)

Long-Term Fuel Trim Cell Usage

Cell I.D.	CeFADR_e_Cell00_PurgOnAirMode5	CeFADR_e_Cell01_PurgOnAirMode4	CeFADR_e_Cell02_PurgOnAirMode3	CeFADR_e_Cell03_PurgOnAirMode2	CeFADR_e_Cell04_PurgOnAirMode1	CeFADR_e_Cell05_PurgOnAirMode0	CeFADR_e_Cell06_PurgOnIdle	CeFADR_e_Cell07_PurgOnDecel	CeFADR_e_Cell08_PurgOffAirMode5	CeFADR_e_Cell09_PurgOffAirMode4	CeFADR_e_Cell10_PurgOffAirMode3	CeFADR_e_Cell11_PurgOffAirMode2	CeFADR_e_Cell12_PurgOffAirMode1	CeFADR_e_Cell13_PurgOffAirMode0	CeFADR_e_Cell14_PurgOffIdle	CeFADR_e_Cell15_PurgOffDecel
FASD Cell Usage	CeFADD_e_SelectedPurgeCell	CeFADD_e_SelectedPurgeCell	CeFADD_e_SelectedPurgeCell	CeFADD_e_SelectedPurgeCell	CeFADD_e_SelectedPurgeCell	CeFADD_e_SelectedPurgeCell	CeFADD_e_SelectedPurgeCell	CeFADD_e_NonSelectedCell	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_NonSelectedCell
FASD Enabled In Cell?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	NO	Yes	Yes	Yes	Yes	Yes	Yes	Yes	NO

AFIM Section
P219A

KtOXYD_cmp_AFIM_LngthThrsh1

AvgFlow / AvgRPM	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	3500	4000	4500	5000	6000
40	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560
80	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560
120	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560
160	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560
200	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560
240	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560
280	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560
320	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560
360	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560
400	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560
440	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560
480	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560
520	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560
560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560
640	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560
720	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560
800	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560	1048560

P219B

KtOXYD_cmp_AFIM_LngthThrsh2

AvgFlow / AvgRPM	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	3500	4000	4500	5000	6000
40	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000
80	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000
120	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000
160	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000
200	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000
240	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000
280	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000
320	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000
360	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000
400	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000
440	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000
480	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000
520	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000
560	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000
640	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000
720	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000
800	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000

Supporting Tables

P219A **KtOXYD_K_AFIM_QualFactor1**

AvgFlow / AvgRPM	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	3500	4000	4500	5000	6000
40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
120	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
160	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
200	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
240	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
280	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
320	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
360	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
400	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
440	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
480	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
520	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
560	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
640	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
720	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
800	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

P219B **KtOXYD_K_AFIM_QualFactor2**

AvgFlow / AvgRPM	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	3500	4000	4500	5000	6000
40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
120	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
160	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
200	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
240	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
280	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
320	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
360	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
400	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
440	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
480	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
520	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
560	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
640	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
720	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
800	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Closed Loop Enable Criteria

Engine run time greater than
KtFSTA_t_ClosedLoopTime

Start-Up Coolant	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
Close Loop Enable Time	300.0	260.0	225.0	90.0	80.0	32.0	32.0	32.0	32.0	32.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

and pre converter 02 sensor voltage less than
KfFULC_U_O2_SensorReadyThrshLo

< 1100
Voltage *milliVolts*

for
KcFULC_O2_SensorReadyEvents

> 40 events
(events * 12.5 milliseconds)

and
COSC (Converter Oxygen Storage Control) not enabled
and
Consumed AirFuel Ratio is stoichiometry i.e. not in component protection
and
POPD or Catalyst Diagnostic not intrusive
and
Turbo Scavenging Mode not enabled
and
All cylinders whose valves are active also have their injectors enabled
and
O2S_Bank_ 1_TFTKO, O2S_Bank_ 2_TFTKO, FuelInjectorCircuit_FA and CylinderDeacDriverTFTKO = False

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Supporting Tables

Long Term FT Enable Criteria

Closed Loop Enable and
Coolant greater than
KfFCLL_T_AdaptiveLoCoolant

	> 40 Celcius
Coolant	

or less than
KfFCLL_T_AdaptiveHiCoolant

	< 120
Coolant	*Celcius*

and
KtFCLL_p_AdaptiveLowMAP_Limit

Barometric Pressure	65	70	75	80	85	90	95	100	105
Manifold Air Pressure	16.0	16.0	16.0	16.0	16.0	17.0	18.0	18.0	18.0

and
TPS_ThrottleAuthorityDefaulted = False
and
Flex Fuel Estimate Algorithm is not active
and
Excessive fuel vapors boiling off from the engine oil algorithm (BOFR) is not enabled
and
Catalyst or EVAP large leak test not intrusive

Secondary Fuel Trim Enable Criteria

Closed Loop Enable and
KfFCLP_U_O2ReadyThrshLo

	< 1100
Voltage	*milliVolts*

for
KcFCLP_Cnt_O2RdyCyclesThrsh

	> 80 events
(events * 12.5 milliseconds)	

Long Term Secondary Fuel Trim Enable Criteria

									X10 Y10	X11 Y11	X12 Y12	X13 Y13	X14 Y14	X15 Y15	X16 Y16	X17 Y17	
KtFCLP_t_PostIntglDisableTime																	
Start-Up Coolant	-40	-29	-18	-6	5	16	28	39	50	61	73	84	95	106	118	129	140
Post Integral Enable Time	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Plus									X10 Y10	X11 Y11	X12 Y12	X13 Y13	X14 Y14	X15 Y15	X16 Y16	X17 Y17	
KtFCLP_t_PostIntglRampInTime																	
Start-Up Coolant	-40	-29	-18	-6	5	16	28	39	50	61	73	84	95	106	118	129	140
Post Integral Ramp In Time	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	40.0	30.0	20.0	10.0	10.0	10.0	10.0	10.0	10.0

and
KeFCLP_T_IntegrationCatalystMax

	< 1000
Modeled Catalyst Temper	*Celcius*

and
KeFCLP_T_IntegrationCatalystMin

	> 425
Modeled Catalyst Temper	*Celcius*

and
PO2S_Bank_1_Snsr_2_FA and PO2S_Bank_2_Snsr_2_FA = False

Cold Start Emissions Diagnostic
P050D

	KtCSEC_t_ExtendedEngineExit				
Pct Eth Concentration /	0	25	50	75	100
0	45	45	45	45	45
0.125	45	45	45	45	45
0.25	45	45	45	45	45
0.375	45	45	45	45	45
0.5	22	22	22	22	22
0.625	22	22	22	22	22
0.75	22	22	22	22	22
0.875	22	22	22	22	22
1	22	22	22	22	22

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Supporting Tables

AFIM

KtFABD_U_VarThresh1

AvgFlow / AvgRPM	700	900	1100	1300	1500	1700	1900	2100	2300	2500	3000	3500	4000	4500	5000	5500	6000
100	16384	16384	16384	16384	16384	16384	16384	16384	16384	16384	16384	16384	16384	16384	16384	16384	16384
150	16	16	18	18	22	22	20	18	16	16	14	13	13	13	15	15	15
200	16	16	18	18	22	22	20	18	16	16	14	13	13	13	15	15	15
250	20	20	25	30	25	22	22	20	20	20	18	16	15	14	14	14	14
300	50	30	35	35	35	30	30	30	30	30	30	30	25	22	22	20	20
350	40	40	40	40	40	40	40	40	40	40	38	35	35	30	28	25	25
400	45	45	50	50	50	50	50	50	50	50	50	50	45	45	45	45	35
450	50	50	65	65	65	65	65	60	60	60	60	60	60	55	50	48	42
500	60	60	65	65	65	65	80	80	80	80	80	80	70	63	57	53	16384
550	65	65	65	65	80	85	90	90	90	90	90	90	85	74	16384	16384	16384
600	66	67	70	80	85	85	95	95	95	95	95	95	95	16384	16384	16384	16384
650	16384	74	80	90	95	95	105	105	105	105	105	105	105	16384	16384	16384	16384
700	16384	82	90	100	100	105	115	115	115	115	115	115	115	16384	16384	16384	16384
750	16384	16384	95	100	100	110	115	115	115	115	115	115	115	16384	16384	16384	16384
800	16384	16384	100	105	110	115	115	115	115	115	115	115	115	16384	16384	16384	16384
1000	16384	16384	16384	115	115	115	115	115	115	115	115	115	115	16384	16384	16384	16384
1200	16384	16384	16384	115	115	115	115	115	115	115	115	115	115	16384	16384	16384	16384

KtFABD_K_QualFactor1

AvgFlow / AvgRPM	700	900	1100	1300	1500	1700	1900	2100	2300	2500	3000	3500	4000	4500	5000	5500	6000
100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
150	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
200	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
250	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
300	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
350	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
400	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
450	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00
500	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00
550	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00
600	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00
650	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00
700	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00
750	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00
800	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00
1000	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00
1200	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00

KtFABD_U_Normalizer1

AvgFlow / AvgRPM	700	900	1100	1300	1500	1700	1900	2100	2300	2500	3000	3500	4000	4500	5000	5500	6000
100	16384	16384	16384	16384	16384	16384	16384	16384	16384	16384	16384	16384	16384	16384	16384	16384	16384
150	16384	16384	16384	16384	16384	16384	16384	16384	16384	16384	16384	16384	16384	16384	16384	16384	16384
200	20	20	20	20	15	15	15	15	15	15	15	15	15	15	20	20	20
250	20	20	20	20	20	20	20	15	15	15	15	15	15	15	20	15	15
300	20	20	20	20	20	20	20	20	20	20	30	20	20	15	10	5	5
350	20	20	20	20	20	20	20	20	20	20	20	20	30	10	10	10	10
400	20	20	20	20	20	20	20	20	20	20	20	20	30	20	15	12	11
450	30	30	20	25	25	25	25	25	25	25	25	25	25	25	20	16	16384
500	35	35	30	30	30	35	30	30	30	30	30	30	10	16384	16384	16384	16384
550	30	30	30	30	30	25	30	30	20	20	30	30	20	16384	16384	16384	16384
600	16384	32	35	30	30	30	30	30	30	30	30	30	30	16384	16384	16384	16384
650	16384	31	30	35	35	30	25	25	25	25	25	25	28	16384	16384	16384	16384
700	16384	16384	30	30	30	20	20	20	20	20	20	20	24	16384	16384	16384	16384
750	16384	16384	30	30	30	20	20	20	20	20	20	20	22	16384	16384	16384	16384
800	16384	16384	16384	30	30	30	30	30	30	30	30	25	25	16384	16384	16384	16384
1000	16384	16384	16384	30	30	30	30	30	30	30	30	30	30	16384	16384	16384	16384
1200	16384	16384	16384	16384	30	30	30	30	30	30	30	30	30	16384	16384	16384	16384

Fault Bundle Definitions

EGRValvePerformance_FA	P0401	P042E																		
EGRValveCircuit_FA	P0403	P0404	P0405	P0406																
EGRValve_FP	P0405	P0406	P042E																	
EGRValveCircuit_TFTKO	P0403	P0404	P0405	P0406																
EGRValvePerformance_TFTKO	P0401	P042E																		
CatalystSysEfficiencyLoB1_FA	P0420																			
CatalystSysEfficiencyLoB2_FA	P0430																			
EngineMisfireDetected_TFTKO	P0300	P0301	P0302	P0303	P0304	P0305	P0306	P0307	P0308											
EngineMisfireDetected_FA	P0300	P0301	P0302	P0303	P0304	P0305	P0306	P0307	P0308											
AAP_SnsrFA	naturally	P2227	P2228	P2229	P2230															
	turbocha	P0237	P0238																	
AAP_SnsrCktFP	naturally	P2228	P2229																	
	turbocha	P0237	P0238																	
AAP_SnsrTFTKO	naturally	P2227	P2228	P2229	P2230															
	turbocha	P0237	P0238																	
AAP2_SnsrFA	P2227	P2228	P2229	P2230																
AAP2_SnsrCktFP	P2228	P2229																		
AAP2_SnsrTFTKO	P2227	P2228	P2229	P2230																
TC_BoostPresSnsrCktFA	P0237	P0238																		
TC_BoostPresSnsrFA	P0236	P0237	P0238																	
AmbPresSnsrCktFA	P2228	P2229																		
AmbPresSnsrCktFP	P2228	P2229																		
AmbientAirDefault	baro or	P2227	P2228	P2229	P2230															
	no baro	P0101	P0102	P0103	P0106	P0107	P0108	P0111	P0112	P0113	P0114	P0121	P0122	P0123	P012B	P012C	P012D	P0222	P0223	P1221
AmbPresDfltdStatus	baro or	P2227	P2228	P2229	P2230															
	no baro	P0101	P0102	P0103	P0106	P0107	P0108	P0111	P0112	P0113	P0114	P0121	P0122	P0123	P012B	P012C	P012D	P0222	P0223	P1221
IAT_SensorCircuitTFTKO	P0112	P0113																		
IAT_SensorCircuitFA	P0112	P0113																		
IAT_SensorCircuitFP	P0112	P0113																		
IAT_SensorTFTKO	P0111	P0112	P0113																	
IAT_SensorFA	P0111	P0112	P0113																	
IAT2_SensorCktTFTKO	IAT2 Pre	P0097	P0098																	
	IAT2 No	P0112	P0113																	
IAT2_SensorCircuitFA	IAT2 Pre	P0097	P0098																	
	IAT2 No	P0112	P0113																	
IAT2_SensorcircuitFP	IAT2 Pre	P0097	P0098																	
	IAT2 No	P0112	P0113																	
IAT2_SensorTFTKO	IAT2 Pre	P0096	P0097	P0098																
	IAT2 No	P0111	P0112	P0113																
IAT2_SensorFA	IAT2 Pre	P0096	P0097	P0098																
	IAT2 No	P0111	P0112	P0113																
ThrotTempSensorTFTKO	IAT2 Pre	P0096	P0097	P0098																
	IAT2 No	P0111	P0112	P0113																

Fault Bundle Definitions

ThrotTempSensorFA	IAT2 Pre	P0096	P0097	P0098
	IAT2 No	P0111	P0112	P0113
SuperchargerBypassValveFA	P2261			
CylDeacSystemTFTKO	P3400			
MAF_SensorPerfFA	P0101			
MAF_SensorPerfTFTKO	P0101			
MAP_SensorPerfFA	P0106			
MAP_SensorPerfTFTKO	P0106			
SCIAP_SensorPerfFA	P012B			
SCIAP_SensorPerfTFTKO	P012B			
ThrottlePositionSnsrPerfFA	P0121			
ThrottlePositionSnsrPerfTFTKO	P0121			
TIAP_SensorPerfFA	P0236			
MAF_SensorFA	P0101	P0102	P0103	
MAF_SensorTFTKO	P0101	P0102	P0103	
MAF_SensorFP	P0102	P0103		
MAF_SensorCircuitFA	P0102	P0103		
MAF_SensorCircuitTFTKO	P0102	P0103		
MAP_SensorTFTKO	P0106	P0107	P0108	
MAP_SensorFA	P0106	P0107	P0108	
MAP_SensorCircuitFP	P0107	P0108		
SCIAP_SensorFA	P012B	P012C	P012D	
SCIAP_SensorTFTKO	P012B	P012C	P012D	
SCIAP_SensorCircuitFP	P012C	P012D		
AfterThrottlePressureFA	naturally aspirated, turbocharged	P0106	P0107	P0108
	supercha	P012B	P012C	P012D
AfterThrottleVacuumTFTKO	naturally aspirated, turbocharged	P0106	P0107	P0108
	supercha	P012B	P012C	P012D
SCIAP_SensorCircuitFA	P012C	P012D		
AfterThrottlePressTFTKO	naturally aspirated, turbocharged	P0106	P0107	P0108
	supercha	P012B	P012C	P012D
MAP_SensorCircuitFA	P0107	P0108		
MAP_EngineVacuumStatus	MAP_SensorFA OR P0107, P0108 Pending			

Fault Bundle Definitions

CrankCamCorrelationTFTKO	P0016	P0017	P0018	P0019								
CrankSensorFA	P0335	P0336										
CrankSensorTFTKO	P0335	P0336										
CamSensorFA	P0016	P0017	P0018	P0019	P0340	P0341	P0345	P0346	P0365	P0366	P0390	P0391
CamSensorTFTKO	P0016	P0017	P0018	P0019	P0340	P0341	P0345	P0346	P0365	P0366	P0390	P0391
CrankIntakeCamCorrelationFA	P0016	P0018										
CrankExhaustCamCorrelationFA	P0017	P0019										
IntakeCamSensorTFTKO	P0016	P0018	P0340	P0341	P0345	P0346						
IntakeCamSensorFA	P0016	P0018	P0340	P0341	P0345	P0346						
ExhaustCamSensorTFTKO	P0017	P0019	P0365	P0366	P0390	P0391						
ExhaustCamSensorFA	P0017	P0019	P0365	P0366	P0390	P0391						
IntakeCamSensor_FA	P0016	P0018	P0340	P0341	P0345	P0346						
IntakeCamSensor_TFTKO	P0016	P0018	P0340	P0341	P0345	P0346						
ExhaustCamSensor_FA	P0017	P0019	P0365	P0366	P0390	P0391						
ExhaustCamSensor_TFTKO	P0017	P0019	P0365	P0366	P0390	P0391						
CrankIntakeCamCorrFA	P0016	P0018										
CrankExhaustCamCorrFA	P0017	P0019										
CrankSensorFaultActive	P0335	P0336										
CrankSensor_FA	P0335	P0336										
CrankSensorTestFailedTKO	P0335	P0336										
CrankSensor_TFTKO	P0335	P0336										
CamSensor_FA	P0016	P0017	P0018	P0019	P0340	P0341	P0345	P0346	P0365	P0366	P0390	P0391
CamSensorAnyLocationFA	P0016	P0017	P0018	P0019	P0340	P0341	P0345	P0346	P0365	P0366	P0390	P0391
CamSensor_TFTKO	P0016	P0017	P0018	P0019	P0340	P0341	P0345	P0346	P0365	P0366	P0390	P0391
EngModeNotRunTmErr	P2610											
ECT_Sensor_Ckt_FA	P0117	P0118										
ECT_Sensor_Ckt_TPTKO	P0117	P0118										
ECT_Sensor_Ckt_TFTKO	P0117	P0118										
ECT_Sensor_DefaultDetected	P0117	P0118	P0116	P0119								
ECT_Sensor_FA	P0117	P0118	P0116	P0119	P0128							
ECT_Sensor_TFTKO	P0117	P0118	P0116	P0119								
ECT_Sensor_Perf_FA	P0116											
ECT_Sensor_Ckt_FP	P0117	P0118										
ECT_Sensor_Ckt_High_FP	P0118											
ECT_Sensor_Ckt_Low_FP	P0117											
THMR_Insuff_Flow_FA	P00B7											
THMR_Therm_Control_FA	P0597	P0598	P0599									
THMR_RCT_Sensor_Ckt_FA	P00B3	P00B4										
THMR_ECT_Sensor_Ckt_FA	P0117	P0118	P0116	P00B6								
O2S_Bank_ 1_TFTKO	P0131	P0132	P0134	P2A00								
O2S_Bank_ 2_TFTKO	P0151	P0152	P0154	P2A03								
O2S_Bank_1_Sensor_1_FA	P2A00	P0131	P0132	P0133	P0134	P0135	P0053	P1133	P015A	P015B	P0030	
O2S_Bank_1_Sensor_2_FA	P013A	P013B	P013E	P013F	P2270	P2271	P0137	P0138	P0140	P0141	P0054	P0036
O2S_Bank_2_Sensor_1_FA	P2A03	P0151	P0152	P0153	P0154	P0155	P0059	P1153	P015C	P015D	P0050	
O2S_Bank_2_Sensor_2_FA	P013C	P013D	P014A	P014B	P2272	P2273	P0157	P0158	P0160	P0161	P0060	P0056
PO2S_Bank_1_Snsr_2_FA	P0137	P0138	P0140	P0036	P0054	P0141	P2270	P2271				
PO2S_Bank_2_Snsr_2_FA	P0157	P0158	P0160	P0056	P0060	P0161	P2272	P2273				
FuelInjectorCircuit_FA	P0201	P0202	P0203	P0204	P0205	P0206	P0207	P0208				
	P0261	P0264	P0267	P0270	P0273	P0276	P0279	P0282				
	P0262	P0265	P0268	P0271	P0274	P0277	P0280	P0283				
	P2147	P2150	P2153	P2156	P216B	P216E	P217B	P217E				
	P2148	P2151	P2154	P2157	P216C	P216F	P217C	P217F				
	P1248	P1249	P124A	P124B	P124C	P124D	P124E	P124F				

Fault Bundle Definitions

FuelInjectorCircuit_TFTKO	P0201 P0202 P0203 P0204 P0205 P0206 P0207 P0208 P0261 P0264 P0267 P0270 P0273 P0276 P0279 P0282 P0262 P0265 P0268 P0271 P0274 P0277 P0280 P0283 P2147 P2150 P2153 P2156 P216B P216E P217B P217E P2148 P2151 P2154 P2157 P216C P216F P217C P217F P1248 P1249 P124A P124B P124C P124D P124E P124F
FHPR_b_PumpCkt_FA	P0090 P0091 P0092 P00C8 P00C9 P00CA
FHPR_b_PumpCkt_TFTKO	P0090 P0091 P0092 P00C8 P00C9 P00CA
FHPR_b_FRP_SnsrCkt_FA	P0192 P0193
FHPR_b_FRP_SnsrCkt_TFTKO	P0192 P0193
EngineMetalOvertempActive	P1258
BSTR_b_PCA_CktFA	P0033 P0034 P0035 P0045 P0047 P0048 P0243 P0245 P0246 P0247 P0249 P0250
BSTR_b_PCA_CktTFTKO	P0033 P0034 P0035 P0045 P0047 P0048 P0243 P0245 P0246 P0247 P0249 P0250
BSTR_b_PCA_CktLoTFTKO	P0034 P0047 P0245 P0249
BSTR_b_PstnCntrlFA	P166D P166E
BSTR_b_PstnCntrlTooLoTFTKO	P166D P166E
BSTR_b_PstnCntrlTooHiTFTKO	P166D P166E
BSTR_b_PCA_PstnSnsrFA	P003A P2564 P2565
BSTR_b_PCA_PstnSnsrTFTKO	P003A P2564 P2565
BSTR_b_TurboBypassCktFA	P0033 P0034 P0035 P00C0 P00C1 P00C2
BSTR_b_TurboBypassCktTFTKO	P0033 P0034 P0035 P00C0 P00C1 P00C2
BSTR_b_IC_PmpCktFA	P023A P023C
BSTR_b_PCA_FA	P0234 P0299 P0033 P0034 P0035 P0045 P0047 P0048 P0243 P0245 P0246 P2261 P0247 P0249 P0250
BSTR_b_PCA_TFTKO	P0234 P0299 P0033 P0034 P0035 P0045 P0047 P0048 P0243 P0245 P0246 P2261 P0247 P0249 P0250
BSTR_b_ExcsvBstFA	P226B
BSTR_b_ExcsvBstTFTKO	P226B
BSTR_b_PresCntrlTooLoTFTKO	P0299
BSTR_b_PresCntrlTooHiTFTKO	P0234
BSTR_b_TurboBypB_CktFA	P00C0 P00C1 P00C2
BSTR_b_TurboBypB_CktTFTKO	P00C0 P00C1 P00C2
KS_Ckt_Perf_B1B2_FA	P0324 P0325 P0326 P0327 P0328 P0330 P0332 P0333 P06B6 P06B7
IgnitionOutputDriver_FA	P0351 P0352 P0353 P0354 P0355 P0356 P0357 P0358
IAC_SystemRPM_FA	P0506 P0507
TCM_EngSpdReqCkt	P150C
PPS1_OutOfRange_Composite	P2122 P2123 P06A3
PPS2_OutOfRange_Composite	P2127 P2128 P0697
PPS1_OutOfRange_Composite	P2122 P2123 P06A3
PPS2_OutOfRange_Composite	P2127 P2128 P0697
PPS1_OutOfRange	P2122 P2123
PPS2_OutOfRange	P2127 P2128
PPS1_OutOfRange	P2122 P2123
PPS2_OutOfRange	P2127 P2128
AcceleratorPedalFailure	P2122 P2123 P2127 P2128 P2138 P0697 P06A3
ControllerRAM_Error_FA	P0604
ControllerProcessorPerf_FA	P0606
TPS1_OutOfRange_Composite	P0122 P0123 P06A3
TPS2_OutOfRange_Composite	P0222 P0223 P06A3
TPS_FA	P0122 P0123 P0222 P0223 P2135

Fault Bundle Definitions

TPS_TFTKO	P0122 P0123 P0222 P0223 P2135
TPS_Performance_FA	P0068 P0121 P1104 P2100 P2101 P2102 P2103
TPS_Performance_TFTKO	P0068 P0121 P1104 P2100 P2101 P2102 P2103
TPS_FaultPending	P0122 P0123 P0222 P0223 P2135
TPS_FaultPending	P0122 P0123 P0222 P0223 P2135
TPS_ThrottleAuthorityDefaulted	P0068 P0122 P0123 P0222 P0223 P16F3 P1104 P2100 P2101 P2102 P2103 P2135
EnginePowerLimited	P0068 P0122 P0123 P0222 P0223 P0606 P16F3 P1104 P2100 P2101 P2102 P2103
	P160E P160D P0191 P0192 P0193 P00C8 P00C9 P00CA P0090 P0091 P0092 P228C
	P2135 P2138 P2122 P2123 P2127 P2128 P228D P06A3 P0697
5VoltReferenceA_FA	P0641
5VoltReferenceB_FA	P0651
5VoltReferenceMAP_OOR_Flt	P0697
EvapPurgeSolenoidCircuit_FA	P0443
EvapFlowDuringNonPurge_FA	P0496
EvapVentSolenoidCircuit_FA	P0449
EvapSmallLeak_FA	P0442
EvapEmissionSystem_FA	P0455 P0446
FuelTankPressureSnsrCkt_FA	P0452 P0453
CoolingFanSpeedTooHigh_FA	P0495
FanOutputDriver_FA	P0480 P0481 P0482
FuelLevelDataFault	P0461 P0462 P0463 P2066 P2067 P2068
PowertrainRelayFault	P1682
PowertrainRelayStateOn_FA	P0685
PowertrainRelayStateOn_Error	P0685
IgnitionOffTimer_FA	P2610
IgnitionOffTimeValid	P2610
EngineModeNotRunTimerError	P2610
EngineModeNotRunTimer_FA	P2610
VehicleSpeedSensor_FA	P0502 P0503 P0722 P0723
VehicleSpeedSensorError	P0502 P0503 P0722 P0723
TransmissionGearDefaulted	MYD/M\ P182E P1915
	M30/M3 P1915 P182A P182C P182D P182E P182F
TransmissionEngagedState_FA	MYD/M\ P182E P1915
	M30/M3 P1915 P182A P182C P182D P182E P182F
Transmission Output Shaft Angular Velocity Validity	MYD/M\ P0722 P0723 P077D P077C
	M30/M3 P0722 P0723
EngOilTempSensorCircuitFA	P0197 P0198
EngOilModeledTempValid	ECT_Se IAT_SensorCircuitFA
EngOilPressureSensorCktFA	P0522 P0523
EngOilPressureSensorFA	P0521 P0522 P0523
CylnderDeacDriverTFTKO	P3401 P3409 P3417 P3425 P3433 P3441 P3449
BrakeBoosterSensorFA	P0556 P0557 P0558

Fault Bundle Definitions

BrakeBoosterVacuumValid	P0556 P0557 P0558
BrakeBoosterVacuumValid	VehicleS MAP_SensorFA
CylnderDeacDriverTFTKO	P3401 P3409 P3417 P3425 P3433 P3441 P3449
EngineTorqueEstInaccurate	EngineM FuelInjec FuelInjec FuelTrim FuelTrim MAF_Se MAP_Se EGRValuePerforamnce_FA
FuelTrimSystemB1_FA	P0171 P0172
FuelTrimSystemB2_FA	P0174 P0175
FuelTrimSystemB1_TFTKO	P0171 P0172
FuelTrimSystemB2_TFTKO	P0174 P0175
A/F Imbalance Bank1	P219A
A/F Imbalance Bank2	P219B
AIRSystemPressureSensor FA	P2430 P2431 P2432 P2433 P2435 P2436 P2437 P2438
AIR System FA	P0411 P2440 P2444
AIRValveControlCircuit FA	P0412
AIRPumpControlCircuit FA	P0418
Clutch Sensor FA	P0806 P0807 P0808
ClutchPositionSensorCircuitLo FA	P0807
ClutchPositionSensorCircuitHi FA	P0808
Ethanol Composition Sensor FA	P0178 P0179 P2269

LowFuelConditionDiagnostic	Flag set to TRUE if the fuel level < AND No Active DTCs: FuelLevelDataFault P0462 P0463 for at least 30 seconds.
Transfer Pump is Commanded On	Fuel Volume in Primary Fuel Tank < 0.0 liters AND Fuel Volume in Secondary Fuel Tank ≥ 0.0 liters AND Transfer Pump on Time < **TransferPumpOnTimeLimit** Table AND Transfer Pump had been Off for at least 0.0 seconds AND Evap Diagnostic (Purge Valve Leak Test, AND Engine Running

Long Name	**Short Name**
Bank	B
Brake	Brk
Circuit	Ckt
Engine	Eng
Fault Active	FA
Intake	Intk
Naturally Aspirated	NA
Performance	Perf

Fault Bundle Definitions

Position	Pstn
Pressure	Press
Sensor	Snsr
Supercharged	SC
System	Sys
Test Failed This Key On	TFTKO
Rough Road	RR

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Rail Pressure (FRP) Sensor Performance (rationality)	P018B	This DTC detects a fuel pressure sensor response stuck within the normal operating range	Absolute value of change in fuel pressure as sensed during intrusive test.	<= 30 kPa			Frequency: Continuous; 12.5 ms loop. 60 seconds between intrusive tests that pass Intrusive test requested if fuel system is clamped for >= 5 seconds or fuel pressure error variance <= typically (0.3 to 0.6) (calculated over a 2.5sec period); otherwise report pass	DTC Type A 1 trip
					1. FRP Circuit Low DTC (P018C)	not active		
					2. FRP Circuit High DTC (P018D)	not active		
					3. FuelPump Circuit Low DTC (P0231)	not active	Duration of intrusive test is fueling related (5 to 12 seconds).	
					4. FuelPump Circuit High DTC (P0232)	not active		
					5. FuelPump Circuit Open DTC (P023F)	not active	Intrusive test is run when fuel flow is below Max allowed fuel flow rate (Typical values in the range of 11 to 50 g/s)	
					6. Reference Voltage DTC (P0641)	not active		
					7. Fuel Pump Control Module Driver Over-temperature DTC's (P064A, P1255)	not active		
					8. Control Module Internal Performance DTC (P0606)	not active		
					9. Engine run time	>=5 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					10. Emissions fuel level (PPEI $3FB) AND Engine Run Time 11. Fuel pump control 12. Fuel pump control state 13. Engine fuel flow 14. ECM fuel control system failure (PPEI $1ED)	not low > 30 sec enabled normal or FRP Rationality control > 0.047 g/s failure has not occurred		
Fuel Rail Pressure (FRP) Sensor Circuit Low Voltage	P018C	This DTC detects if the fuel pressure sensor circuit is shorted to low	FRP sensor voltage	< 0.14 V	Ignition	Run or Crank	72 failures out of 80 samples 1 sample/12.5 ms	DTC Type A 1 trip
Fuel Rail Pressure (FRP) Sensor Circuit High Voltage	P018D	This DTC detects if the fuel pressure sensor circuit is shorted to high	FRP sensor voltage	> 4.86 V	Ignition	Run or Crank	72 failures out of 80 samples 1 sample/12.5 ms	DTC Type A 1 trip
Fuel Pump Control Circuit Low Voltage	P0231	This DTC detects if the fuel pump control circuit is shorted to low	Fuel Pump Current	> 14.48A	Ignition OR HS Comm OR Fuel Pump Control AND Ignition Run/Crank Voltage	Run or Crank enabled enabled 9V < voltage < 32V	72 test failures in 80 test samples if Fuel Pump Current <100A 3 test failures in 15 test samples if Fuel Pump Current >=100A 1 sample/12.5 ms	DTC Type A 1 trip
Fuel Pump Control Circuit High Voltage	P0232	This DTC detects if the fuel pump control circuit is shorted to high	Voltage measured at fuel pump circuit	> 3.86 V	Commanded fuel pump output Fuel pump control enable	0% duty cycle (off) False	36 test failures in 40 test samples; 1 sample/12.5ms Pass/Fail determination made only once per trip	DTC Type A 1 trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Time that above conditions are met	>=4.0 seconds		
Fuel Pump Control Circuit (Open)	P023F	This DTC detects if the fuel pump control circuit is open	Fuel Pump Current AND Fuel Pump Duty Cycle	<=0.5A > 20%	Ignition OR HS Comm OR Fuel Pump Control AND Ignition Run/Crank voltage	Run or Crank Enabled Enabled 9V <voltage< 32V	72 test failures in 80 test samples; 1 sample/12.5ms	DTC Type A 1 trip
Fuel System Control Module Enable Control Circuit	P025A	This DTC detects if there is a fault in the fuel pump control enable circuit	PPEI (PPEI (Powertrain Platform Electrical Interface) Fuel System Request ($1ED)	≠ Fuel Pump Control Module Enable Control Circuit	Ignition AND PPEI Fuel System Request ($1ED)	Run or Crank Valid	72 failures out of 80 samples 1 sample/12.5 ms	DTC Type A 1 trip
Control Module Read Only Memory (ROM)	P0601	This DTC will be stored if any software or calibration check sum is incorrect	Calculated Checksum (CRC16)	≠ stored checksum for any of the parts (boot, software, application calibration, system calibration)	Ignition OR HS Comm OR Fuel Pump Control	Run or Crank enabled enabled	1 failure if it occurs during the first ROM test of the ignition cycle, otherwise 5 failures Frequency: Runs continuously in the background	DTC Type A 1 trip
Control Module Not Programmed	P0602	Indicates that the FSCM needs to be programmed	This DTC is set via calibration, when KeMEMD_b_NoStart Cal	TRUE	Ignition OR HS Comm OR Fuel Pump Control	Run or Crank enabled enabled	Runs once at power up	DTC Type A 1 trip
Control Module Long Term Memory Reset	P0603	Non-volatile memory checksum error at controller power-up	Checksum at power-up	≠ checksum at power-down	Ignition OR	Run or Crank	1 failure Frequency: Once at power-up	DTC Type A 1 trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					HS Comm OR Fuel Pump Control	enabled enabled		
Control Module Random Access Memory (RAM)	P0604	Indicates that control module is unable to correctly write and read data to and from RAM	Data read	≠ Data written	Ignition OR HS Comm OR Fuel Pump Control	Run or Crank enabled enabled	1 failure if it occurs during the first RAM test of the ignition cycle, otherwise 5 failures Frequency: Runs continuously in the background.	DTC Type A 1 trip
Control Module Internal Performance 1. Main Processor Configuration Register Test 2. Processor clock test	P0606	This DTC indicates the FSCM has detected an internal processor fault or external watchdog fault (PID 2032 can tell what causes the fault.)	1. For all I/O configuration register faults: •Register contents 2. For Processor Clock Fault: •EE latch flag in EEPROM. OR • RAM latch flag.	Incorrect value. 0x5A5A 0x5A	Ignition OR HS Comm OR Fuel Pump Control 1. For all I/O configuration register faults: •KeMEMD_b_ProcFltCfgRegEnbl 2. For Processor Clock Fault: •KeMEMD_b_ProcFltCLKDiagEnbl	Run or Crank enabled enabled TRUE TRUE	Tests 1 and 2 1 failure Frequency: Continuously (12.5ms) Test 3 3 failures out of 15 samples 1 sample/12.5 ms	DTC Type A 1 trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
3. External watchdog test			3. For External Watchdog Fault: • Software control of fuel pump driver	Control Lost	3. For External Watchdog Fault: •KeFRPD_b_FPExtWDogDiagEnbl 3. For External Watchdog Fault: •Control Module ROM(P0601) 3. For External Watchdog Fault: •Control Module RAM(P0604)	TRUE not active not active		
Control Module Long Term Memory (EEPROM) Performance	P062F	Indicates that the NVM Error flag has not been cleared	Last EEPROM write	Did not complete	Ignition OR HS Comm OR Fuel Pump Control	Run or Crank enabled enabled	1 test failure Once on controller power-up	DTC Type A 1 trip
5Volt Reference Circuit (Short High/Low)	P0641	Detects continuous short on the #1 5V sensor reference circuit	Reference voltage AND Output OR Reference voltage AND Output OR Reference voltage AND Output	>= 0.5V inactive . >= 5.5V active <= 4.5V active	Ignition	Run or Crank	15 failures out of 20 samples 1 sample/12.5 ms	DTC Type A 1 trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Control Module - Driver Over-temperature 1	P064A	This DTC detects if an internal fuel pump driver overtemperature condition exists under normal operating conditions (Tier 1 supplier Continental responsibility)	Module Range of Operation	1. Module is within Acceptable Operation Range (Motorola's responsibility - FSCM is in normal operating range for module voltage versus PWM duty cycle. Linear range from 100% @ 12.5V to 70% @ 18V.)	Ignition OR HS Comm OR Fuel Pump Control AND Ignition Run / Crank	Run or Crank Enabled Enabled 9V<voltage<32V	3 failures out of 15 samples 1 sample/12.5 ms	DTC Type B 2 trips
			AND Fuel pump driver Temp	> 190C	KeFRPD_b_FPOverTempDiagEnbl	TRUE		
Fuel Pump Control Module - Driver Over-temperature 2	P1255	This DTC detects if an internal fuel pump driver overtemperature condition exists under extreme operating conditions (GM's responsibility)	Module Range of Operation	Outside normal range (FSCM is NOT in normal operating range for module voltage versus PWM duty cycle. Linear range from 100% @ 12.5V to 70% @ 18V.)	Ignition OR HS Comm OR Fuel Pump Control AND Ignition Run / Crank	Run or Crank Enabled Enabled 9V<voltage<32V	3 failures out of 15 samples 1 sample/12.5 ms	DTC Type B 2 trips
			AND Fuel pump driver Temp	> 190C	KeFRPD_b_FPOverTempDiagEnbl	TRUE		
Ignition 1 Switch Circuit Low Voltage	P2534	This DTC detects if the Ignition1 Switch circuit is shorted to low or open	Ignition 1 voltage	<= 6 V	Engine	Running	279 failures out of 300 samples 1 sample/25.0 ms	DTC Type A 1 trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Flow Performance (rationality)	P2635	This DTC detects degradation in the performance of the SIDI electronic return-less fuel system	Filtered fuel rail pressure error	<= Low Threshold (function of desired fuel rail pressure and fuel flow rate. 15% of resultant Target Pressure) OR >= High Threshold (function of desired fuel rail pressure and fuel flow rate. 15% of resultant Target Pressure) **(See Supporting Tables tab)**	1. FRP Circuit Low DTC (P018C)	not active	Filtered fuel rail pressure error Time Constant = 12.5 seconds Frequency: Continuous 12.5 ms loop	DTC Type B 2 trips
					2. FRP Circuit High DTC (P018D)	not active		
					3. Fuel Pressure Sensor Performance DTC (P018B)	not active		
					4. FuelPump Circuit Low DTC (P0231)	not active		
					5. FuelPump Circuit High DTC (P0232)	not active		
					6. FuelPump Circuit Open DTC (P023F)	not active		
					7. Reference Voltage DTC (P0641)	not active		
					8. Fuel Pump Control Module Driver Over-temperature DTC's (P064A, P1255)	not active		
					9. Control Module Internal Performance DTC (P0606)	not active		
					10. An ECM fuel control system failure (PPEI $1ED)	has not occurred		
					11. The Barometric pressure (PPEI $4C1) signal	valid (for absolute fuel pressure sensor)		
					12. Engine run time	>= 30 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					13. Emissions fuel level (PPEI $3FB) AND Engine Run Time	not low > 30 sec		
					14. Fuel pump control	enabled		
					15. Fuel pump control state	normal		
					16. Battery Voltage	11V<=voltage=<32V		
					17. Fuel flow rate **(See Supporting Tables tab)**	> 0.047 g/s **AND** <= Max allowed fuel flow rate as a function of desired rail pressure & Vbatt (Typical values in the range of 11 to 50 g/s)		
					18. Fuel Pressure Control System	Is not responding to an over-pressurization due to pressure build during DFCO or a decreasing desired pressure command.		
Control Module Communication Bus “A” Off	U0073	Detects that a CAN serial data bus shorted condition has occurred to force the CAN device driver to enter a bus-off state	Bus Status	Off	Power mode	Run/Crank	5 failures out of 5 samples (5 seconds)	DTC Type B 2 trips
Lost Communication With ECM/PCM “A”	U0100	Detects that CAN serial data communication has been lost with the ECM	Message $0C9	Undetected	1. Power mode 2. Ignition Run/Crank Voltage 3. U0073	Run/Crank 11V<=voltage=<32V not active	12 failures out of 12 samples (12 seconds)	DTC Type B 2 trips

Supporting Tables

X-axis= Desired Fuel Pressure (kiloPascals)
Y-axis= Battery voltage (volts)

	200	250	300	350	400	450	500	550	600
4.5	19.5	19.5	19.5	19.5	19.5	19.08594	16.86719	14.6875	12.53906
6	19.5	19.5	19.5	19.5	19.5	19.08594	16.86719	14.6875	12.53906
7.5	19.5	19.5	19.5	19.5	19.5	19.08594	16.86719	14.6875	12.53906
9	19.5	19.5	19.5	19.5	19.5	19.08594	16.86719	14.6875	12.53906
10.5	19.5	19.5	19.5	19.5	19.5	19.08594	16.86719	14.6875	12.53906
12	19.5	19.5	19.5	19.5	19.5	19.5	19.5	19.5	19.10938
13.5	19.5	19.5	19.5	19.5	19.5	19.5	19.5	19.5	19.5
15	19.5	19.5	19.5	19.5	19.5	19.5	19.5	19.5	19.5
16.5	19.5	19.5	19.5	19.5	19.5	19.5	19.5	19.5	19.5
18	19.5	19.5	19.5	19.5	19.5	19.5	19.5	19.5	19.5
19.5	19.5	19.5	19.5	19.5	19.5	19.5	19.5	19.5	19.5
21	19.5	19.5	19.5	19.5	19.5	19.5	19.5	19.5	19.5
22.5	19.5	19.5	19.5	19.5	19.5	19.5	19.5	19.5	19.5
24	19.5	19.5	19.5	19.5	19.5	19.5	19.5	19.5	19.5
25.5	19.5	19.5	19.5	19.5	19.5	19.5	19.5	19.5	19.5
27	19.5	19.5	19.5	19.5	19.5	19.5	19.5	19.5	19.5
28.5	19.5	19.5	19.5	19.5	19.5	19.5	19.5	19.5	19.5

Supporting Tables

P2635 Fuel Pump Performance Filtered Pressure Error Fault Threshold High map (kiloPascals)

X-axis= Target Fuel Pressure (kiloPascals)
Y-axis= Fuel Flow (grams / s)

	200	250	300	350	400	450	500	550	600
0	30	37.5	45	52.5	60	67.5	75	82.5	90
1.5	30	37.5	45	52.5	60	67.5	75	82.5	90
3	30	37.5	45	52.5	60	67.5	75	82.5	90
4.5	30	37.5	45	52.5	60	67.5	75	82.5	90
6	30	37.5	45	52.5	60	67.5	75	82.5	90
7.5	30	37.5	45	52.5	60	67.5	75	82.5	90
9	30	37.5	45	52.5	60	67.5	75	82.5	90
10.5	30	37.5	45	52.5	60	67.5	75	82.5	90
12	30	37.5	45	52.5	60	67.5	75	82.5	90
13.5	30	37.5	45	52.5	60	67.5	75	82.5	90
15	30	37.5	45	52.5	60	67.5	75	82.5	90
16.5	30	37.5	45	52.5	60	67.5	75	82.5	90
18	30	37.5	45	52.5	60	67.5	75	82.5	90
19.5	30	37.5	45	52.5	60	67.5	75	82.5	90
21	30	37.5	45	52.5	60	67.5	75	82.5	90
22.5	30	37.5	45	52.5	60	67.5	75	82.5	90
24	30	37.5	45	52.5	60	67.5	75	82.5	90
25.5	30	37.5	45	52.5	60	67.5	75	82.5	90
27	30	37.5	45	52.5	60	67.5	75	82.5	90
28.5	30	37.5	45	52.5	60	67.5	75	82.5	90
30	30	37.5	45	52.5	60	67.5	75	82.5	90
31.5	30	37.5	45	52.5	60	67.5	75	82.5	90
33	30	37.5	45	52.5	60	67.5	75	82.5	90
34.5	30	37.5	45	52.5	60	67.5	75	82.5	90
36	30	37.5	45	52.5	60	67.5	75	82.5	90
37.5	30	37.5	45	52.5	60	67.5	75	82.5	90
39	30	37.5	45	52.5	60	67.5	75	82.5	90
40.5	30	37.5	45	52.5	60	67.5	75	82.5	90
42	30	37.5	45	52.5	60	67.5	75	82.5	90
43.5	30	37.5	45	52.5	60	67.5	75	82.5	90
45	30	37.5	45	52.5	60	67.5	75	82.5	90
46.5	30	37.5	45	52.5	60	67.5	75	82.5	90
48	30	37.5	45	52.5	60	67.5	75	82.5	90

Supporting Tables

P2635 Fuel Pump Performance Filtered Pressure Error Fault RePass Threshold High map (kiloPascals)

X-axis= Target Fuel Pressure (kiloPascals)
Y-axis= Fuel Flow (grams / s)

	200	250	300	350	400	450	500	550	600
0	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
1.5	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
3	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
4.5	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
6	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
7.5	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
9	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
10.5	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
12	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
13.5	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
15	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
16.5	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
18	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
19.5	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
21	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
22.5	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
24	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
25.5	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
27	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
28.5	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
30	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
31.5	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
33	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
34.5	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
36	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
37.5	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
39	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
40.5	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
42	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
43.5	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
45	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
46.5	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
48	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5

Supporting Tables

P2635 Fuel Pump Performance Filtered Pressure Error Fault Threshold Low map (kiloPascals)

X-axis= Target Fuel Pressure (kiloPascals)
Y-axis= Fuel Flow (grams / s)

	200	250	300	350	400	450	500	550	600
0	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
1.5	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
3	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
4.5	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
6	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
7.5	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
9	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
10.5	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
12	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
13.5	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
15	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
16.5	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
18	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
19.5	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
21	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
22.5	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
24	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
25.5	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
27	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
28.5	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
30	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
31.5	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
33	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
34.5	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
36	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
37.5	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
39	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
40.5	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
42	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
43.5	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
45	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
46.5	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
48	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90

Supporting Tables

P2635 Fuel Pump Performance Filtered Pressure Error Fault RePass Threshold Low map (kiloPascals)

X-axis= Target Fuel Pressure (kiloPascals)
Y-axis= Fuel Flow (grams / s)

	200	250	300	350	400	450	500	550	600
0	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
1.5	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
3	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
4.5	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
6	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
7.5	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
9	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
10.5	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
12	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
13.5	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
15	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
16.5	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
18	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
19.5	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
21	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
22.5	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
24	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
25.5	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
27	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
28.5	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
30	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
31.5	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
33	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
34.5	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
36	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
37.5	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
39	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
40.5	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
42	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
43.5	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
45	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
46.5	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
48	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5